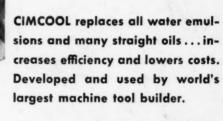
Modern Machine Shop

one NEW cutting fluid covers 85% of all jobs



- * Faster cooling allows faster cutting.
- ★ High chemical lubricity reduces tool wear.
- tong lasting rust inhibitor included.
- * Non-irritating . . . doesn't grow rancid.

The Multi-Rurpose Cutting Fluid



CIMCOOL

DIVISION OF THE CINCINNATI MILLING

CHIO



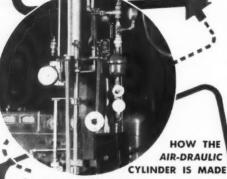
JOB DATA

OPERATION — Heat and quench at various points on rod.

STROKE TIME — 11 seconds.

CYL. SIZE — 3" bore, 15" stroke. AIR PRESSURE — 90# reduced to 70#.

CYL. MOUNTING - Rod-end flange.



 Separate air and hydraul'c pistons assembled as an integral unit on a common piston rod.

Self-contained hydraulic circuit does not require a hydraulic power unit.

 Air operating cylinder is brass-lined steel tubing; piston has cup packings, self-adjusted by air.

 Hydraulic regulating cylinder is centrifugalcast iron; piston has 3 automotive-type rings.

 Standard sizes from 3" to 8" bore; any stroke to 5 ft. For operation at air pressures to 150 p.s.i. Uniformly accurate feed at a varying rate is required to heat treat sections of automotive shift rods at the plant of a large independent transmission producer. While compressed air is available, ordinary air cylinders do not provide the necessary control and uniformity of movement. The answer was found in the Logan Air-Draulic Cylinder.

An electric solenoid operated valve controls the air which powers the cylinder, and the cycle is initiated by pressing a button on the machine panel. As the air piston moves, oil flows between the chambers of the hydraulic piston on the common piston rod. Piston speed is regulated by a camoperated valve in this self-contained hydraulic circuit.

A cam attached to the piston rod is designed to provide rapid approach and accurate feed at the required speed, with rapid completion of the stroke and return. Induction heating and quenching are co-ordinated with the cylinder movement. Shift rods of several sizes are handled on this

or several sizes are handled on this machine by substituting different cams.

Write for FREE Literature

and Engineering Help



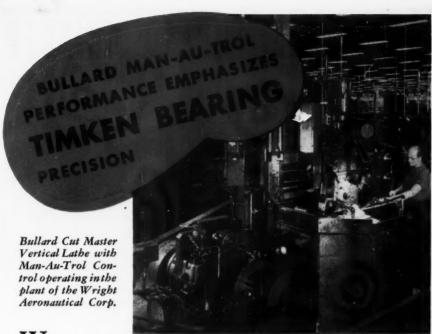
*TIME *EFFORT *MOTION

Air and Hydraulic Equipment

LOGANSPORT MACHINE CO., INC.

901 CENTER AVE: LOGANSPORT INDIANA

CHUCKS - CYLINDERS - VALVES - PRESSES - SURE - FLOW COOLANT PUMPS



When the Bullard Company developed the Man-Au-Trol Control, they selected the Bullard Cut Master Vertical Turret Lathe for the first application.

They did so because they knew the Cut Master possessed the great stamina necessary to assume the burden of complete and continuous automatic operation under heavy cutting loads.

They knew that the machine design was scientifically correct; that the construction assured the necessary accuracy and rigidity. And they realized that the presence of Timken Tapered Roller Bearings in the table and throughout the drive provided additional assurance of speedability, precision and endurance.

The tremendous ability of Bullard Man-Au-Trol equipped Cut Master Vertical Turret Lathes has been proved on war production and is being repeated in competitive peace-time manufacture where increased output and reduced cost are so vital.

Genuine Timken Bearings are identified by the trade-mark "TIMKEN". Make sure it appears on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.



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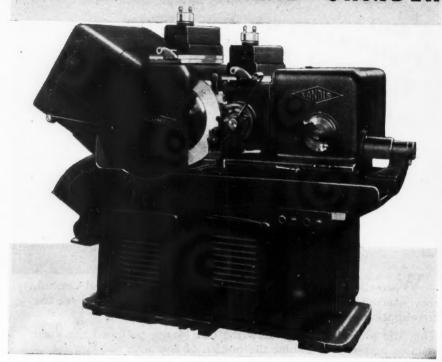
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CENTERLESS THREAD GRINDER



Announced in 1944

NOW AVAILABLE

A most desirable feature of the LANDIS Machine Company's Centerless Thread Grinder is the ability to thru-feed headless parts or plungé-cut headed work. This feature gives the machine a much wider field of application.

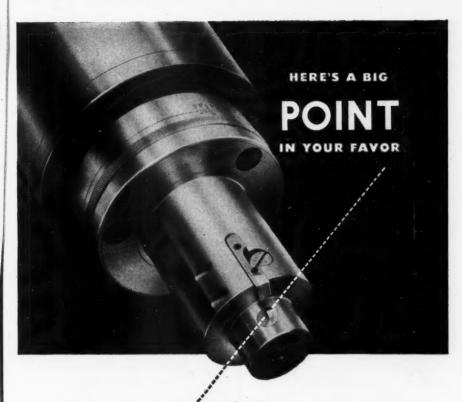
Write for Particulars

LANDIS MACHINE COMPANY WAYNESBORO, U.S.A.

MODERN MACHINE SHOP

Jich

June, 1946



...when it comes to precision finishing HEALD can help you do it better... and at lower cost!

With costs rising all along the line, you've got to get the most out of your machine tools if you're going to produce at a profit. That's where Heald engineering comes in—pointing the way to more economical production . . . to simplified set-ups and automatic control . . . with the very latest equipment for precision finishing, by grinding or borizing.

Here, for example, is how one manufacturer gained by bringing his problem to Heald. He had cylinders that required boring, turning, chamfering, and facing. It looked like a job for twelve lathes . . . until Heald engineers showed him how to get a better, production rate with just two Bore-Matics. Result: he saved 40% in equipment cost, 83% in floor space, 90% in man-hours . . . a total saving of 60% in the cost of the finished product!

Such savings are being made and can be made when you put Heald machines on your production line. And it makes no difference whether you operate a small shop or plant employing hundreds of workers—Heald's staff of 200 engineers is always ready to help you find new ways of improving your production and cutting your costs. For further information, write: The Heald Machine Company, Worcester 6, Mass.

HEALD

means more precision

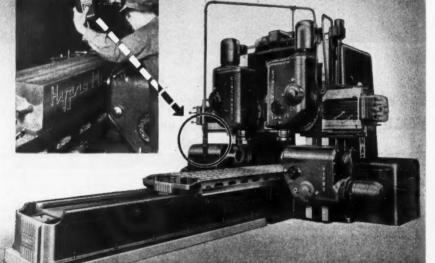
. . . less cost

INTERNAL AND SURFACE GRINDING MACHINES . BORE-MATIC PRECISION FINISHING MACHINES .

NOW COMPLETE FINGER-TIP CONTROL

LLYDIO ELECTRONIC PLANER MILLER DRIVE

Photo on left shows operator milling the words Hypro Miller in cast-fron block — an unusual demonstration of the versatility and absolute control of any head or table from pendant station exclusively.



THE CINCINNATI HYPRO PLANER COMPANY

PLANERS - BORING MILLS - PLANER TYPE MILLERS
CINCINNATI, OHIO





HERE is another example of how GARD-NER Double-Grinding is helping make possible the high production schedules that are necessary to meet present-day competition. As compared to the ordinary Surface Grinder, which employs one head and grinds one surface at a time, these modern Gardner Grinders carry two opposed wheels and grind parallel surfaces simultaneously.

The No. 125-23" GARDNER Double-Head GRINDER, shown above, grinds both parallel faces of hard rubber meter valve discs to close tolerances in one operation. A "pushthrough" type fixture and rubber roll feeder carry the discs between opposed abrasive wheels in a rapidly moving continuous stream.

PRODUCTION: 20 to 30 pieces per minute, on a valve disc 3¾" diameter x .185" thick; removing .010" stock over all.

TOLERANCES: .0005" for parallelism and .001" for uniformity.



Write for GARDNER Double-Grinding Bulletins!

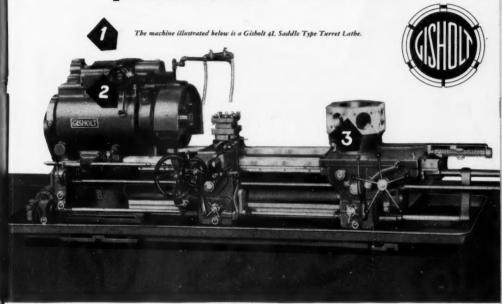
GARDNER-GRIND YOUR Flat SURFACES

GARDNER MACHINE COMPANY
428 East Gardner Street , , , , Beloit, Wisconsin, U.S.A.

3 ways to increase production

Actual cutting time on a turret lathe is usually determined by using the maximum speeds and feeds the cutting tools will withstand. Isn't it true, therefore, that the greatest opportunity for time-saving is in cutting the lag between cuts?

By substituting automatic operation for certain manual motions, Gisholt Turret Lathes have made it possible to increase the percentage of actual cutting time in relation to the complete cycle. This means increased production—lower machining costs.





Spindle speed changes can be made instantly without stopping the spindle or re-

leasing the main drive clutch. The' Gisholt Hydraulic Speed Selector, power operated, eliminates manual gear shifting. It may be operated either direct or pre-set.



Hydraulic spindle control provides for starting, stopping or reversing by a mere touch of

this handy lever. When in neutral position, braking is automatic, bringing the spindle to a quick, smooth stop. Headstock control is as easy as pressing buttons.



Power rapid traverse for both hexagon and square turrers insures quicker

movement of tools in and out of cutting position. With transverse travel of the cross slide, time savings are substantial on many jobs. Operating effort is reduced to a minimum.

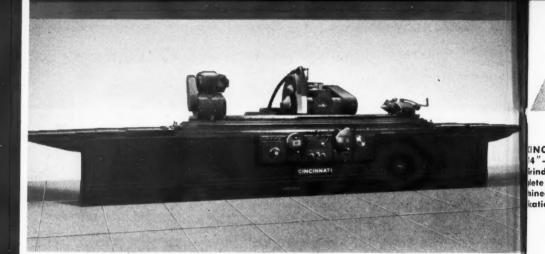
LOOK AHEAD...KEEP AHEAD...WITH GISHOLT

GISHOLT MACHINE COMPANY

1219 E. Washington Avenue · Madison 3, Wisconsin

Announcement

TWO ADDITIONAL SIZES OF ADDIL)



CINCINNATI

CENTER TYPE GRINDING MACHINES

CENTERLESS

GR



10" L MACHINE

CINCINNATI FILMATIC 10"-L Plain Hydraulic Grinding Machine. Write for publication No. G-537 which contains complete information.



AIN HYDRAULIC GRINDING MACHINES OH) THE CINCINNATI LINE

INCINNATI FILMATIC

14"-L Plain Hydraulic

frinding Machine. Comlete details may be obtined by writing for publication No. G-533. These machines have many outstanding and exclusive advantages which give them distinctive qualifications for grinding precision cylindrical work. They fill the

need existing in many shops for centertype grinders capable of rapidly producing exceptionally fine finishes and close tolerances of accuracy in a routine manner and on any production basis. Because of their easy and quick manipulation

features, and the wide selection of attachments which are available, they may be used for toolroom lots or high production work, for traverse grinding and infeed grinding.

If you would like to know more about the features of these new machines, write for descriptive literature as indicated under the illustrations.

FI GRINDERS INCORPORATED

CINCINNATI 9, OHIO, U.S.A.

SS GRINDING MACHINES . CENTERLESS LAPPING MACHINES





with KNIGHT MILLERS

By producing on a single miller, through ordinary methods, jobs that often require two or more machines, Knight Millers are proving every day their unusual value as a time-saving, profit-building investment in hundreds of plants, shops and toolrooms everywhere.

Eliminating special set-ups and the transfer of complicated milling, boring or shaping jobs from one machine to another, ups production and saves operator's time. Knight's tilting, swiveling table makes costly jigs and fixtures unnecessary for out-of-the-ordinary work and greatly increases working area. Wide variation in spindle feeds and speeds provide for the use of many various size cutters.

These features, combined with Knight's acknowledged advantages of speed, precision, accuracy, ruggedness, smooth operating sim-

plicity and convenience mean faster, more efficient operation, uncommon economy in productive hours and a minimum of equipment expense.

How you can keep production up and costs down are all explained in Knight's Catalog which you may have for the asking.

Write for YOUR Copy Today!

W.B.KNIGHT

MACHINERY COMPANY

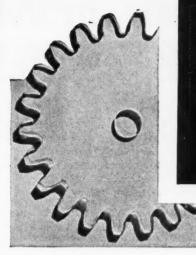
MORE GOODS for MORE PEOPLE at LOWER COST

3920 WEST PINE BLVD. . ST. LOUIS 8, MISSOURI

N-5099 6K12

MODERN MACHINE SHOP

June, 1946









No. 12C Inspection Instrument set-up for checking tooth spacing.



2 The same instrument with Cone Point use.

Ideal for the gear shop that does not require—or cannot afford—the "Red Liner", the Fellows Bench-type Inspection Instrument works to save both time and money. It is quickly changed from one test to another, all checks being made with interchangeable measuring heads and a dial indicator. Both the "cone point" device for checking concentricity, and the tooth spacing device, are fitted for automatically indexing the gear on the return stroke of the indexing lever.

Capacity, for gears up to 12" P.D. on mountings to 15" long. Write for literature.



THE FELLOWS GEAR SHAPER CO., Springfield, Vermont 616 Fisher Bldg., Detroit 2, or 1040 West Town Office Bldg., Chicago 12

Resistance Welding "by the products like this possible!





The serpantine shaped plate above makes an efficient refrigerating unit for a four-can ice cream cabinet. Square one below is for a deep-freeze unit.

SEVEN Federal 75 KVA press type spot welders and two Federal 150 KVA seam welders deliver close to a million spot welds and some five miles of seam weld weekly to produce thousands of feet of Hubbell-Yoder Refrigeration Plate, at the Cleveland plant of The Yoder Company Fabricating Division.

These patented plates make deep storage cabinets, refrigerator cars and trucks, ice cream cabinets and frozen food lockers easier to produce, cheaper and more efficient. They are typical of the many useful products which can be manufactured on a practical production basis only because of the indestructible type of fast automatic fabrication that is natural to resistance welding.

Although similar production can be automatically fed, these plates are hand indexed because of the variety of sizes and shapes involved ... from ten to thirty inches wide, two to ten or more feet long. Two sheets of cold rolled steel are used, one perfectly flat, the other pressembossed with interconnected vertical and horizontal channels. The two sheets are welded together with spot welds, using three-quarter inch electrodes, located at alternate ends of the flat rectangular areas between channels. Edges and ends are seam welded. Some of the larger plates have more than 2200 spots and 25 feet of seam weld. These must be high quality welds, air tight, tested to 200 pounds pressure. The plates must



Sommer and Adams Co., Claveland—SPECIAL HIGH PRECISION MACHINES
The Worren City Mfg. Co., Warren—HEAVY WELDMENT-HEAVY MACHINERY

MACHINE

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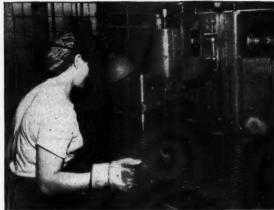
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ABOVE... A long roller table through the throat of the Federal welder makes indexing the plates an easy matter. This plate takes 1600 spots.

RIGHT ABOVE... A similar roller table is used with the Federal seam welder. About twenty-two feet of weld around this plate. When Infra-Red-Baked finish is applied to the plates the welds are not discernable.

AT RIGHT...A few of the many variations in shape of The Hubbell-Yoder plates are shown in this view of the shipping department of The Yoder Fabrication plant.



withstand twisting, right-angle bending, extreme temperature change and in some cases considerable tossing around.

Standard Federal welders and equipment are used in this production. The same installations can be used for an endless variety of ordinary or unusual fabrications, some of which might be yours. It is worth while to remember that resistance welding may well be the answer to some cost cutting problem in your production...that Federal engineers are available to help you find out...that in resistance welding the name of authority is



AND WELDER COMPANY



ABRASIVE No. M-34

VERTICAL SPINDLE GRINDER



. motorized spindle also eliminates belting problems.

SMOOTH ACTION

...special saddle design and built-in shock absorber.

NO VIBRATION

massive, heavily ribbed base casting and head.

FULLY AUTOMATIC

...precise adjustment of table travel and down-feed.

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SPECIFICATIONS

WORK CAPACITY:

24" long 8" wide 12" high

SPINDLE:

Built-in 5 hp motor, 3450 R.P.M. ball and roller bearing

WHEEL SIZE:

Segment type, 6" diam. TABLE SIZE OVERALL

59" x 101/2

NET WEIGHT: 3000 lbs.

14

Write for Bulletin.

We will gladly supply information on Abrasive machines on the U.S. Goverement Surplus Tool List...|sut send us the machine social numbers. We will endoaver to provide attachments, accessories and repair parts as required



ABRASIVE MACHINE TOOL COMPANY EAST PROVIDENCE 14, RHODE ISLAND . DEALERS IN PRINCIPAL CITIF

Die and tool work demands accuracy of

FOSDICK JIG BORER

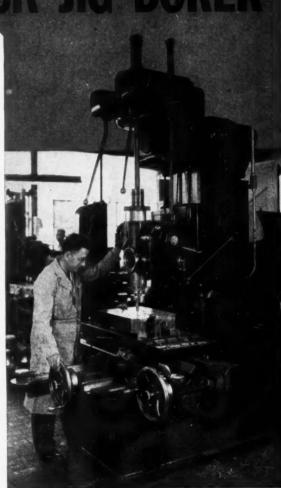
On particularly close tolerance work, such as making the die illustrated, Fosdick Jig Borers are demonstrating their ability to meet the exceptional accuracy demanded in hundreds of tool rooms and tool and die shops.

The machine is exceptionally rigid—for example the bed of rugged construction is heavily ribbed to avoid distortion. A three point bearing serves for leveling and maintains perfect alignment. A sturdy sliding head supports spindle close to the work.

Operation is also very simple. All controls are centralized for ease of control. Twelve speeds in geometrical progression from 60 to 1500 RPM are instantly obtained through a single lever. Nine feeds from .00125 inch to .010 inch are available through a single control lever with direct reading index.

Thus the Fosdick Jig Borer offers all the advantages of high priced precision machines at a comparatively low cost. If you have a precision drilling —boring—facing or even light milling operation—put it on a Fosdick for speed — accuracy and low cost.

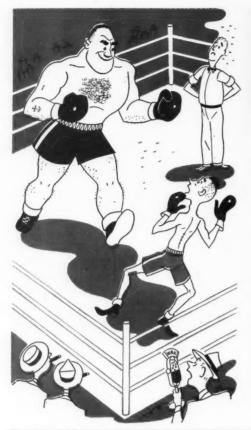
946



A full descriptive bulletin is available—ask for Fosdick Jig Borer Bulletin M.S.J.

FOSDICK

MACHINE TOOL CO.



you wouldn't march a bantamweight against a heavyweight

Nor should you put carbide cutting tools on a lathe lacking the fundamentals for their most efficient use. These cutting tools have increased horsepower requirements 300 per cent and more. They have increased cutting speeds 200 to 500 per cent.

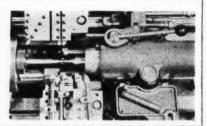
Your profits may well depend upon the efficiency of your turning operations. For instance, in your plant, turning probably accounts for 25 per cent or more of machining time. This could be substantially reduced by the most efficient use of carbide cutting tools, and an important saving in manufacturing cost effected.

It will pay you to check now on the production efficiency of all metal turning equipment in your plant — and to replace it; if need be, with high production war surplus machines or new machines. Jones & Lamson Fay Automatic Lathes and Universal Turret Lathes are designed specifically for the most efficient use of carbide cutting tools.

We are anxious to assist all owners of Jones & Lamson equipment bought from government surplus, to obtain the best possible results from their purchases. Telephone or write to us for complete particulars.

What Horsepower Are YOU Using?

15 horsepower is required to turn and face this small steering rod at the high surface speeds required by the carbide cutting tools. Fay Automatic Lathes are designed specifically for the most efficient use of carbide cutting tools.



Engineered to "Carry the Load" for Most Productive Operation With Carbide Cutting Tools

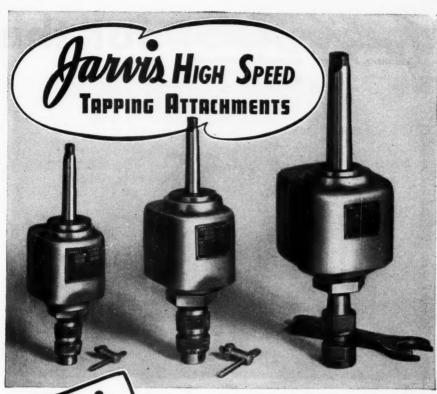


JONES & LAMSON

MACHINE COMPANY Springfield, Vermont, U.S.A.



Manufacturer of: Universal Turret Lethes • Fay Automatic Lethes • Automatic Double-End Milling and Centering MachineseAutomatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chesers • Ground



TAPPING ATTACHMENTS

FLEXIBLE

SHAFT MACHINES

GROUND

ROTARY FILES

OUICK CHANGE CHUCKS

AND COLLETS

They save Time and Taps

Jarvis Tapping Attachments for high speed production. Built for long, dependable service. Famous for long tap life and extreme accuracy. Save time and taps with Jarvis High Speed Tappers.

Send for our new catalog MFTI

THE CHARLES L. JARVIS COMPANY
MIDDLETOWN, CONN.

June, 1946

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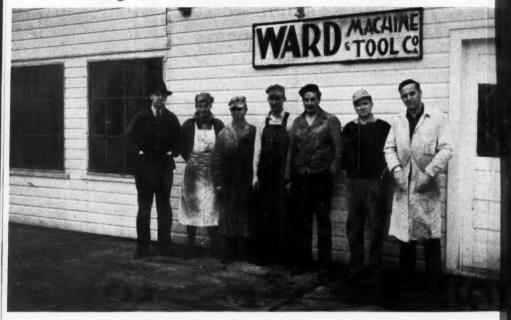
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MODERN MACHINE SHOP

17

DETROIT PUBLIC LIBRARY

A Life Saver for this



Thousands of small contract shops were of immeasurable help in our country's wartime need ... now these small businesses, along with big business, face reconversion problems.

The Ward Machine & Tool Co., Alden, New York, employing only seven men, was a busy little shop throughout the war. With the addition of a Warner & Swasey No. 3 Universal to the shop's engine and bench lathes, it produced miscellaneous parts and service tools for airplane manufacturers, tire companies, and mine sweeper parts for the Navy Department.

Terminations and cancellations came with devastating suddenness after V-J Day.

It was a case of getting other work quickly, or getting out of business. The Ward Company sought and obtained orders for peacetime parts —parts for farm machinery, floor surfacing machines, plastic molding machines and auto

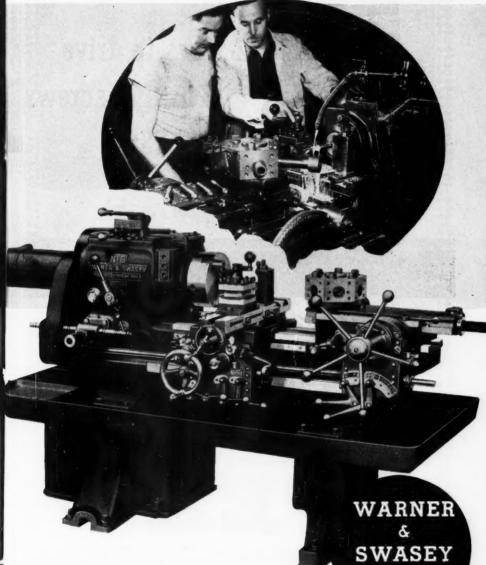
trailers...yes, even small parts for fishing tackle.

It wasn't possible to produce these peacetime jobs profitably on the old equipment. The adaptability, speed and accuracy of the Warner & Swasey No. 3 Universal proved to be a veritable business life saver. It could handle the diversified new work, permit economical prices to customers and show profits.

This small shop gives full credit to this single turret lathe for enabling it to weather a serious reconversion upset.

The Ward Company, typifying the ingenuity and enterprise of small business in America, expects to stay in business and "go places."

small machine shop



Machine Tools

Cleveland

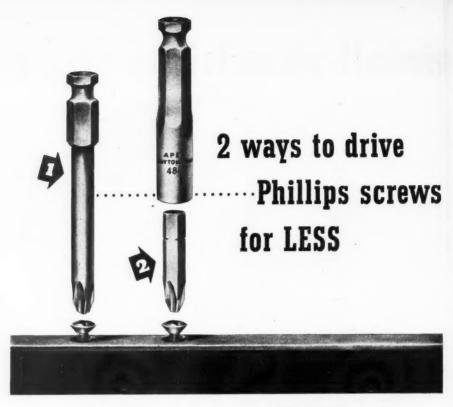
YOU CAN MACHINE IT BETTER, FASTER, FOR LESS... WITH A WARNER & SWASEY

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ity ca,



... and they're both BEST!

1. Best for driving Phillips screws in close quarters, when you need a bit of minimum diameter. By returning worn bits to Apex for complete reconditioning, you can multiply service life many times — actually get eight lives per inch of bit. The cost: a fraction of the price of new bits.

Shanks: for all your electric, pneumatic, or spiral drivers.

2. Best for driving screws where space permits the slightly larger OD of the Apex exclusive bit holder, with the replaceable insert tip. Once you get holders for your drivers, it's a cinch to stock four sizes of tips to fit

practically all your bit holders and drive the full range of Phillips screw sizes. Tips float in holders, seat more easily in screw recesses, simplify bit inventory, give maximum service.

Write today for Catalog 15 on Apex standard power bits and Bulletin 102 on Apex insert type bits.

THE APEX MACHINE AND TOOL COMPANY, DAYTON, OHIO



Safety Friction Tapping Chucks • Quick Change and Positive Drive Drill Chucks • Vertical Float Tapping Chucks • Parallel Floating Tool Holders • Power Bits for Phillips, Slotted Head and Clutch Head Screw Drivers • Hand Drivers for Phillips and Clutch Head Screws • Aircraft and Industrial Universal Joints • Sockets and Universal Joint Socket Wrenches.



The SAFETY Blades

BREAKAGE ELIMINATED.



"LENOX"

Inasmuch as these are nonbreakable blades they will withstand hard usage, even misuse, without shattering. Sharp twists and kinks, which are the main reason for saw breakage, are absorbed without damaging these blades.

Hackmaster

Reg.U.S.Pat.Off.

Made of Molybdenum High Speed Steel

AMERICAN SAW & MFG. CO.

SPRINGFIELD 1, MASS.

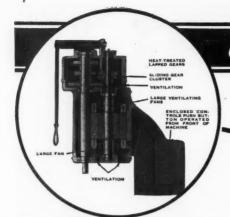
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FEATURE No. 2

THE Wey TYPE MA-6 AVEY-MATIC POWER FED HADD FEED AND REVERSING MOTOR TAPPING MACHINE

features

motor and gear box construction of six speed machine

Motor mounted directly back of spindle with gearing between motor and spindle drive sleeve. Two speed motor, three speed transmission. Only one pair of gears in mesh at any spindle speed. Motor and spindle drive mounted on ball bearings, fan ventilated motor.

> Type MA-6 is made in following capacities: No. 2 — $\frac{1}{4}$ " capacity in cast iron. No. 3 — $\frac{1}{4}$ " capacity in cast iron.

THE AVEY DRILLING MACHINE CO. CINCINNATI . OHIO . U. S. A.



1st Spindle - Avey-matic Feed 2nd Spindle . Hand Feed

3rd Spindle - Tapping (Reversing Motor)



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MACHINE OF THE MONTH

REPARED BY THE SENECA FALLS MACHINE CO. "THE SO-OWING PEOPLE" SENECA FALLS, HEW YOR'S

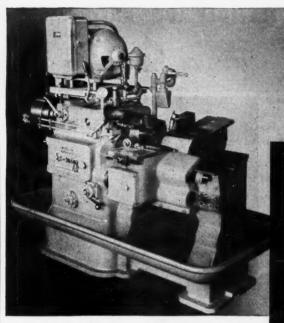


Illustration at left shows a Model "LR" Lo-Swing Lathe equipped for chuck work. This same lathe, tooled as shown in the line drawing below, is used for turning and facing Stator Cores described in this advertisement.

MODEL "LR" AUTOMATIC So-swing LATHE SAVES TIME ON CHUCK WORK

PROBLEM: To automatically turn, face and chamfer Stator Cores for electric motors. Operation must be fast and accurate.

SOLUTION: The Model "LR" Automatic Lo-swing Lathe selected for this job was equipped with a special air-operated, expanding collet chuck which assures close concentricity between the bore and the outside diameter of the Stator Core. The piece is positioned on the expanding collet by means of three equally spaced locating stops, shown

on the line drawing. The collet is expanded by means of a pull bar operated by an air cylinder mounted on the spindle. The outside diameters are turned with four tools mounted on the front slide and the squaring and chamfering is accomplished with three tools mounted on the rear slide.

The Model "LR" Lo-swing Lathe is completely automatic and may be operated by unskilled operators, who merely load and unload the parts and push the starting lever. Seneca Falls Machine Co., Seneca Falls, N. Y.

ATHE NEWS from SENECA FALLS

THERE'S ALWAYS A COMMON LEASE WAY
TO EFFICIENTLY HANDLE WORK LIKE THIS

on a G. & L.

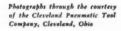


Aerol landing gear cylinder. Its awkward shape requires ingenuity in setting-up for precision machining operations.



Conventional side milling operation being performed on a G. S L. borizontal boring machine equipped with an overarm type arbor support.

A combination of standard attachments is used on this Giddings & Lewis table type machine to simplify the setup and machining of an Aerol landing gear cylinder.







G. & L. Table Type Machine



G. & L. Floor Type Machine



G. & L. Planer Type Machine



G. & L. Multiple Head Type Machine

GIDDINGS & LEWIS MACHINE TOOL CO.



- 1. Use a simple holding fixture on unusual shaped parts.
- 2. Mill, drill and bore in a single work setting.
- 3. Index work on a rotary table for correct alignment.
- Use standard machines with helpful attachments for difficult operations.
- Use a Giddings & Lewis machine on irregular parts similar to this aircraft landing gear cylinder.

There is always a practical and common sense way to set up odd-shaped work and perform difficult machining operations on a Giddings & Lewis machine. These graphic illustrations show how an awkward-tohandle aircraft landing gear cylinder is setup and machined on a standard G. & L. equipped with standard attachments. Few other machines have the open working range, capacity and flexibility required to mount this work and then perform precision boring, drilling and milling operations. Trunnions, trunnion lugs, drag brace lugs and lock lugs are machined before the part is removed from its holding fixture.

Attachments Reduce Machining Time and Eliminate Excessive Handling

Three standard G. & L. attachments are used to cut machining time and reduce set-ups on this part. They are:

- (1) Combination plain and hand feed rotary table that indexes the work with micrometer accuracy and on which the holding fixture is mounted.
- (2) An overarm arbor support attachment is used to permit milling the slots in the trunnion lugs. The part does not have to be routed to a conventional milling machine when this attachment is used.
- (3) An angular milling attachment (not shown) mills the flats on the trunnion lugs and drills and bores at right angles to the machine spindle. The work remains in its fixture for these operations. This combination of helpful attachments increases the working range and adds to the flexibility of the Giddings & Lewis horizontal boring machine.

When you are confronted with the problem of machining work of unusual size or shape, it is advantageous to consider standard G. & L. equipment for your needs. Experienced Giddings & Lewis engineers will gladly point out ways and means of reducing costs on special as well as general run work.



146 Doty Street . Fond du Lac, Wis.



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1946

TOOLS for PRECISION PRODUCTION

MEEHANITE is an engineering material with strength properties that place it in competition with other strong metals . . . plus, the many good properties of a good gray iron.



Masterangle Plates

Try Squares

Angle Attachments

MEEHANITE METAL

represents an outstanding development in the metallurgy of gray iron. The process eliminates the undesirable variations of structural constituents which occur in common gray iron. A new material is created in which the structural form of the matrix and the quantity and distribution of the graphite are under actual control.

Write for Literature



COUNTERBORE

and SPOT

FACER

with MOVABLE INSERTED CUTTERS

Made in 50 Standard Sizes from 9/16" to 31/2" diameter. Features include—easy removal of cutter for sharpening, cutting edge of cutter always in same location, cutter locks securely, pilot drilled and tapped to hold different size bushings, etc.

PROMPT DELIVERY . WRITE FOR LITERATURE

ACME TOOL COMPANY

96 WARREN STREET

NEW YORK 7, N. Y.



Send for Bulletin No. 55

30 Times MORE ACCURATE

Selow is the dividing head proper, showing the micrometer, scope, and hand wheel.

What does that mean to you? It means that this proven accuracy is available to you for the inspection of gear teeth, master index plate notches, splines, cams and any other form of angular spacing. It means that final assemblies involving gears, cams, splines, etc., will be subject to less scrappage, because angular spacing errors will have been found and corrected.

Vince guarantees the OPTICAL MASTER INSPECTION DIVIDING HEAD to be accurate within two seconds of arc; the master disk graduations to be paced to an accuracy within ONE SECOND of arc; and the ball bearing spindle runout to be within TWENTY-FIVE MILLIONTHS of an inch, total indicator reading (the majority of spindles have less than fifteen millionths runout).

The fact that the VINCO OPTICAL MASTER INSPECTION DIVIDING HEAD has become firmly established throughout industry in such a short time is preof of its dependability and industrial necessity. The following pages it one of many actual cases where the VINCO OPTICAL MASTER DIVIDING HEAD played a vital role in the production of a toothed part.



MILLIONTHS OF AN INCH FOR SALE BY VINCO

VINCO CORPORATION, 8161 SCHAEFER HIGHWAY, DETROIT 27. MICHIGAN, SALES OFFICES, NEW YORK, CHICAGO, CLEVELAND Semi-Automatic Hydraulic Spline and Gear Grinder • Optical Master Inspection Dividing Head • Involute Checker • Angle Tangent to Redius Dresser • Index Plates • Precision Vises • Sine Bors • Straight-side Spline, Serration Spline, Involute Spline and Helical Spline Plug and Ring Gages • Thread Plugs, Rings and Setting Plug Gages • Spur and Helical Master Geors • Munition Gages • Propeller Shaft and Hub Gages • Built-up and Special Gages • Gear Rolling Inspection Fixtures • Indexing Fixtures • Hydraulic Power Control, Utilization and Distribution Units • Engineering, Design and Development • Precision Production Parts.

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Units • Engineering, Design and Development • Precision Production Parts.

VINCO

BECAUSE THEY WERE STUMPED BY A REAL "TOUGHY"

It wasn't unusual! This group of production engineers, representing a large pastern manufacturer,
I with Vinco methods
and Vinco results.

Their request was not an ordinary one however! We were asked to produce, in quantity, mating toothed parts with 18 slots, each slot .017' in width with a tolerance of .0003' and a root diameter held to a uniformity of .0001'.

These parts were produced exactly as specified and were delivered on time and in quantities over and above specified requirements. We cite this one instance only because it is informative. Our long experience in the production of precision instruments and finely finished gages has given us a decided edge on precision production methods and techniques. Equipment and makines of our own design and make, in the capable hands of highly skilled operators, an engineering force thoroughly grounded in every phase of precision design and construction and a sales organization made up of men who combine a full engineering background with a wide and intimate knowledge of the trends and developments in the industrial field are all valid reasons for a further inquiry regarding this important phase of modern production.

Precision parts by Vinco meet your specifications. Give us the chance to prove it.

The Vinco Standard Indicator Surface Ga

Features of this gage include a .0001" custom built, full jeweled, dial i cotor—differential adjusting screw for final settings—1½" to 12" v height range—full 360 degree swing of indicator head—readings car taken on upper or lower surfaces.

Extreme accuracy and flexibility of operation all combine to make standard indicator gage practically indispensable wherever rapid and a inspection of surfaces is required. (Incidentally, it was used regularly checking the job mentioned above.) We designed these indicator gages use with the Vinco Optical Master Inspection Dividing Head, but because increasing requests they are now offered for general sale.

Vinco Universal Dividing Head

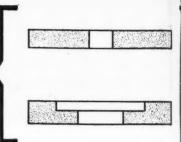
Developed by Vinco to handle light machining or grinding, this universalizing head played a vital part in the manufacture of the "tough A ratio of 1440 to 1 between handle and work spindle provides an extremities the provided of spacing accuracy, even when using standard commercial dividing head plates.

The dividing head can be mounted either vertically or horizontally. It tures a large diameter spindle mounted in a double row of Vinco designable bearings, a tapered spindle nose for work adaptors, a face plat 11" diameter, a graduated dial on the spindle for initial settings, an auxiliary resetting dial and a 11.459" pitch diameter helical gear index plate with 360 accurately spaced teeth.

VINCO CORPORATION, 8861 SCHAEFER HIGHWAY DETROIT 27, MICHIGAN



Sometimes a different shape determines



better grinding



In terms of grinding wheel life, as well as efficiency and economy—the wheel shape selected for a specific opera-

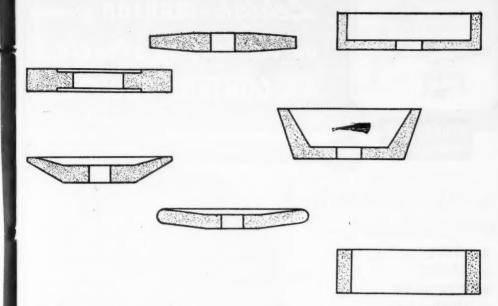
tion is worth careful consideration. This is equally true for both production operations and tool-room grinding.

To help you check your grinding opera-

tions... to assist in selecting the best combination of shape, grit, grade and bond, follow the simple plan of many top notch production men. Consult with your CARBORUNDUM salesman or our distributor's representative. Many customers consider his opinions of real, practical value. His suggestions are based on a

A good rule for good grinding... CALL





knowledge of abrasive developments ... supported by daily experience with plenty of on-the-job grinding applications. If the problem is unusually difficult, the CARBORUNDUM representative may call in an Abrasive Engineer for consultation. Both representative and Abrasive Engineer have available to them the facil-

ities and resources of the world's most noted abrasive laboratories.

Through this single practice, of calling in CARBORUNDUM, you can be sure of getting maximum efficiency from your grinding wheels and other abrasive products. The Carborundum Company, Niagara Falls, New York.

IN CARBORUNDUM

TRADE

BONDED ABRASIVES

WHEELS

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Silicon Carbide Aluminum Oxide Diamond Cylinder Hones

Sticks, Stones & Rubs Specialties COATED ABRASIVES

MARK

Paper, Cloth and Combination

Sheets, Rolls, Discs

ABRASIVE GRAINS AND COMPOUNDS

for:

Polishing Lapping

Pressure Blasting

Finishing

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company

June, 1946

MODERN MACHINE SHOP

3



Lehigh-MARTON presents an outstanding advance in AIR-CONTROL EQUIPMENT

1 DOES THE WORK OF 4

4-WAY COMBINATION
UNIT includes--

- VALVE
- GAUGE
- REGULATOR
- LUBRICATOR
 AND STRAINER

Provides 2, 3, 4 and 6 way action for pressures up to 200 lb. Packless construction. Automatically lubricates all moving cylinder parts. Exclusive design permits unreduced flow of free air from outlet ports.



41,200 CYCLES PER DAY on "American" Broaching Machine in the Plant of AUTO SPECIALTIES MFG. CO.

Auto Specialties, one of the largest jack manufacturers in America, credit this exceptional production to the simple one unit Lehigh-MARTON installation and the elimination of time-wasting, trouble-making operations with the old-fashioned multi-piece hook-up. Many other Lehigh-MARTON users report equally fine records.

We Will Be Happy to Send You DATA Sheets and Catalog. Address:

MARTON AIR VALVE DIVISION

Lehigh Foundries, Inc.

Plant & General Offices: EASTON, PENNA.

New England Representative: MARTON EQUIPMENT, INC., 195 Cabot Street, Beverly, Mass.



Lehigh MARTOI DELAYED ACTION VALVE

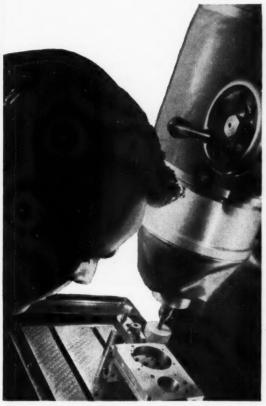
For single con trol of Mult operation

A Packless, Quick-opening HAND VALVE for 4-way operation



HOW TO RELOCATE AND FINISH GRIND HOLES TO .0001"

IN 1/3 THE TIME



No LONGER is it necessary for toolmakers to labor over buttons and locating plugs to correct holes in hardened parts... not if you use the Moore Jig Grinder.

You can rely entirely on this unique machine to mechanically relocate and finishgrind straight or tapered holes to exact size and location in 1/4 to 1/4 the time required by conventional methods.

Accurate lead screws built into the Jig Grinder enable operators to guide the work rapidly to precise location within .0001" at the turn of the micrometer dials. This eliminates hours of checking on the bench and surface plate.

Working to figures instead of to "fit," the Moore Jig Grinder takes die-making out of the "one-man" class and puts it on an interchangeable parts and assembly basis for the first time. Die, stripper and punch plates can now be produced concurrently with better alignment of mating parts and more uniform clearance between punch and die. Multi-section dies are quickly ground in a single set-up... eliminating separate-section hole grinding and the accompanying problems of accurately locating each section in the die bed.

MOORE SPECIAL TOOL CO., INC. 730 UNION AVENUE, BRIDGEFORT 7. CONN.

NEW 28-PAGE CATALOG describes Moore Jig Grind-er's application to dies, drill jigs, gage parts, master plates and production parts.





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Moore Jig Grinder THE ONLY MACHINE OF ITS KIND

June, 1946

MODERN MACHINE SHOP

33

NELCO Carboloy-Tipped 3 FLUTE END MILL

did this job in 1/6th the 7ime

New NELCO 3 FLUTE CARBOLOY-TIPPED END MILL:



- Plunges into solid metal and mills Will bore hole and mill in one operation.
- Eliminates Chatter
 —providing smoother
 cutting—a better job
 in astonishingly re duced time.



 Mills so smoothly that a finished cut is either not required at all, or to a much lesser degree.





 Provides Cooler and Freer Milling — More CHIP room decrores the chance of work overheating and twisting.

This tool is manufactured for use on all types of alloy steel, cast iron, brass and bronze. Sizes ranging from %" to 2" diameter.

Write for additional detailed literature.

and did it Better!

One of the objective tests used by Nelco Engineers was the cutting of a "teyway". (Results illustrated below) End Mills compared were high-speed steel and Nelco's new Carboloy-tipped 3 FLUTE. Material was S.A.E. 1095 steel shafting. End Mills were '\s' "diameters a 3 H.P.

milling machine was used in both cases; 2400

R.P.M. and 14" per minute feed was used for the Garboloy: 609 R.P.M. and 3" per minute

feed for the high-speed steel.

OPERATIONAL RESULTS:

To complete the job using high-speed steel end mill.



NOW COMPARE NELCO RESULT!

Job completed using Nelco's new Carboloy-tipped 3 Flute End Mill!



NCTE: ABOVE TEST PHOTOS UNRETOUCHEE

SAVE Hundreds of Valuable PRODUCTION HOURS By Giving The NELCO FIELD ENGINEER A Few Minutes Time!

For more complete details of this and other tests conducted by Nelco, write or see your local Nelco Field Engineer.

NELCO also manufactures a complete line of Carboloy-Tipped Milling Cutters, End Mills, and Twist Drills.

For That EXTRA EDGE In Production

370 Hamilton Avenue, Dept. , Brooklyn 31, N. Y.

Any One Of These Well Known Distributors Will Be Glad To Help You

Albany—Sager-Spuck Supply Co., Inc.
Ballimore—L. A. Benson Co., Inc.
Bridgeport—Hawley Hardware Co.
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Cleveland—J. W. Mull, Jr.

Detroit—B-H Tool and Supply Co. Indianapolis—J. W. Mull, Jr. Newark—A. N. Nelson, Inc.

Div. General Carbides Co. Philadelphia—Carey-McFall Co. Pittsburgh—J. W. Mull, Jr. Syracuse—A. V. Wiggins & Co. Toledo—J. W. Mull, Jr. Waterbury—White Supply Co. West Hartford—Robert E. Morris Co. York—L. A. Benson Co., Inc.



This large eastern manufacturer recently received an order for a die for embossing aluminum milk bottle caps. Nothing like it had been cut prior to the order so no set procedure had been established.

The job was tooled up on several machines in an effort to find out which would produce the most satisfactory results in the least amount of time. The outcome was definite and decisive. Of the machines used, the Gorton 3L Pantograph gave the best performance. Not only did it turn out the best die but turned it out in the record time of one hour.

Adaptable to Light Production Milling and Engraving Operations

Gorton Pantographs have no equal in the performance of intricate milling and engraving operations. They can be used for the profiling of grooves, contours and other shapes; for the cutting of dies and models; for engraving numerals and designs in any machinable material; and for numerous other purposes. A special roll attachment makes it possible to work from a flat master or model around rolls, dies, dials, knurls up to 6" in diameter. Gorton Pantographs are available in two and three dimensional models in handle many sizes and types of work.

Consult Gorton Engineering Service

Perhaps some of the work at which you are now engaged could be accomplished better, faster and with greater economy on a Gorton Pantograph. If you will submit detailed prints of your job to Gorton Engineering Service, our engineers will thoroughly investigate the possibilities and send you a complete report of the results. This service is offered free and without obligation.

JOB FACTS! NAME OF PART—Milk Boutle Cap Emboasing Die—Used in the manufacture of aluminum milk bottle caps. MATERIAL—Tool assel—hardened and chrome plated after. MADNINE—Gorons 3-Dimensional Pantograph, Model 3-ls. OPERTIORS— 1. Rough within .001"; depth .008"; apeed 2300 r.p.m. 2. Finish in one cut, depth .001"; speed 2300 r.p.m. TIME—One hour. FREE... Complete Information For complete information on the Gorton Pastograph, write today for Bulletin No. 1655.

GEORGE GORTON MACHINE CO.

1946

*

Whether you're working on small pieces or on 30" x 30" boiler plate, you'll get better results from your Blanchards if they're equipped with Robertson Cool-Cut Segmental Wheels or Ring Wheels.

These precision-built wheels have proved their ability, time and again, to cut grinding time in half—or better. Because of the special Cool-Cut structure, only a few grains are used at a time, providing an unusual degree of chip clearance. The bond holds the cutting grains to the limit of their effectiveness. This increases the life of the wheel and assures cool cutting on the hardest of metals.

One large company, operating on half-inch-thick boiler plate thirty inches square and with a ten-inch hole in the center, was taking 45 minutes to remove .050" stock from one side. Ampere reading was 67-75. When they equipped the Blanchard with a Robertson Cool-Cut Segmental Wheel, grinding time was cut to 20 minutes (less than half the previous time). Feed was stepped up 25%. Ampere reading dropped to 45-50.

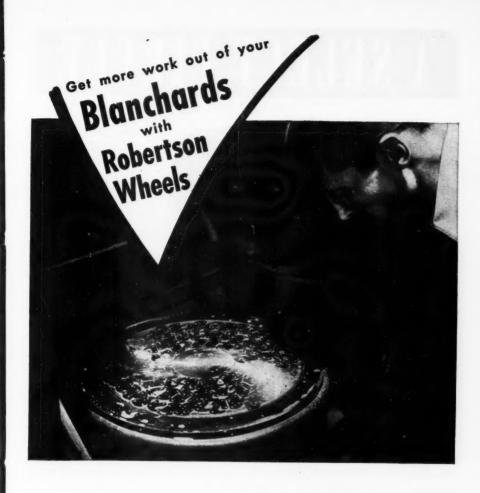
Results such as these, obtained on difficult boiler plate grinding operations, should suggest to you the advisability of using Robertson Cool-Cut Wheels to solve many of your other difficult grinding problems.





Write for a free copy of the booklet, "How to Buy Production-Time," which tells all about Robertson Cool-Cut Wheels.

Manufacturers of



ROBERTSON MANUFACTURING COMPANY TRENTON 5, NEW JERSEY

Vitrified-Bonded Grinding Wheels • Mounted Wheels • Segments

A SELECT CIRCLE



For CIRCLE R Commutator Slotting, Mica Undercutting and Copper Slitting Saws!

Available in sizes ranging from \(\frac{1}{4}'' \) to \(1\frac{3}{4}'' \) in diameter, Circle **R** Slotting, Mica Undercutting and Copper Slitting Saws are ground with clearance to ELIMINATE BINDING.

Based on proved superior performance, Motor Manufacturers SELECT CIRCLE R SAWS to help them build better electric motors for automotive, air and marine use . . . and they SELECT them from America's largest manufacturer of these types of saws, the Circular Tool Company.

CIRCULAR TOOL CO., INC. PROVIDENCE 5, RHODE ISLAND

Chicago, Philadelphia, New York, Dayton, Cleveland, Los Angeles, Rochester, Indianapolis, Detroit, St. Louis, Minneapolis

POWERFUL AIDS

to Peak Production . . . Lower Cost

Thor

PORTABLE ELECTRIC TOOLS Smaller in size and lighter in weight for greater handling ease, Thor Electric Tools have high-efficiency motors that provide more power-per-pound than ever before.

The complete Thor line of portable electric tools includes drills and tappers; screwdrivers and nutsetters; grinders, sanders and polishers; hammers, nibblers and saws. Call your nearby Thor Distributor for a demonstration.

1NDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Boulevard, Chicago 6, Illinois







AUTOMATIC ADJUSTABLE CLUTCH—Thor U16CP Electric Screwdriver drives screws to exact tightness at top speed,



PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

June, 1946

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1946

MODERN MACHINE SHOP



NOPAK Manifold Valves are made in 3- and 4-way styles for single and double acting cylinders.



NOPAK Manifold Valves Promote Efficient Operation

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Where a nu
a single stat
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piping. The
valves are n
with levers
NOPAN I
design, p
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GALLAND-HEN Where a number of air cylinders are to be controlled from a single station, NOPAK Manifold Valves permit highly efficient and compact assembly without complicated, unsightly piping. The operator's efficiency is increased, because all valves are mounted within easy reach on a single manifold, with levers aligned in vertical position.

NOPAK Manifold Valves embody the famous NOPAK Cored Disc design, packless construction, easy, positive control, and leakproof, wearproof qualities. Bases are milled flat to provide a flush surface for gaskets if valves are bolted to a manifold plate. Individual pipe nipples may also be screwed into the valve body if the cored holes in the base are tapped out.

GALLAND-HENNING MFG. CO., 2758 S. 31st St., Milwaukee 7, Wis.



A 4976-1P-A

way ers.

> BUCKEYE BEARINGS

> > Stock Sizes or "Specials" . . . to meet any requirement

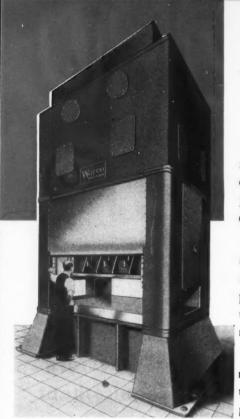
REGULARLY STOCKED in 1088 sizes ranging from 1/4" x 3/8" x 11/4" to 4" x 41/2" x 6", Buckeye stock bearings are the time proved answer for most requirements. For others, Buckeye "Specials" furnished in any recognized bronze bearing analysis; and in any ID, OD and length; slotted, split, drilled or flanged; plain, graphited, or with machined oil grooves, will meet exactly, your own particular, individual needs.

Manufactured from selected materials under our exacting laboratory and metallurgical control, these bearings measure up fully to Buckeye's exacting specifications. Each is a quality product. free from porosity and accurately dimensioned within the required limits assuring speedy, easy assembly, and long, efficient service. Let us quote on your requirements,

Buckeye

BRASS AND MANUFACTURING COMPANY

BRONZE SLEEVE BEARINGS . STANDARD SIZES OR TO CUSTOMERS BLUEPRINT IN ANY RECOGNIZED BEARING METAL ANALYSIS



TWO-POINT ECCENTRIC-GEAR MODELS

Warco two-point eccentric-gear models are built in capacity range from 100 to 1200 tons, stroke range from eight to 36 inches, and between-housings range from 42 to 156 inches and longer. All-steel welded construction permits special features for special manufacturing.



If you have been fortunate enough to receive a press within the past nine months, chances are that it was made entirely or in part by Warco's staff of experienced press engineers and craftsmen.

A portion of our tremendous engineering and production facilities has been and is now being utilized building presses and component parts for companies which have in the past handled the largest share of the nation's press business.

Through the new "Warco" line, we are making all of our facilities available directly to the trade. We are in good position to give prompt delivery. Get in touch with us today for full details.

WARREN CITY MANUFACTURING COMPANY

1942 GRISWOLD STREET, WARREN, OHIO

A Subsidiary of

The Federal Machine and Welder Company
Offices in Principal Cities



PRESS BRAKES

Warco press brakes have a capacity range from 100 to 500 tons and are built to handle lengths up to 24 feet and longer. The machines are compactly designed with low overall height. Gibways are extra long to assure greater accuracy.

A Complete Line of

ALL-STEEL WELDED PRESSES

- **★ Open Back Inclinable Models**
- *Two-Point Eccentric Gear Models
- ★ Straight-Sided Hydraulic Models
- * Mechanical Press Brakes

Weldments are fully stressrelieved to provide maximum

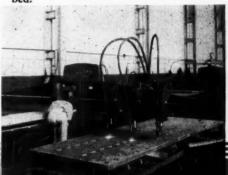
- STRENGTH
- ACCURACY
- RIGIDITY
- ENDURANCE
- POWER



OBI MODELS

Warco OBI Models are manufactured in capacity range from 50 to 200 tons, stroke range from four to 14 inches. All machines are single gear and equipped with the latest type of pneumatic friction clutch and brake unit, air-operated and electrically controlled. Provisions are made for mounting die cushions in the bed.





REGARDING DELIVERY

Large production capacity enables us to handle orders sooner than others not so well situated. Delivery information is available from Warse representatives.

UNSURPASSED PRODUCTION PACILITIES AT YOUR SERVICE

The Warco plant is one of the largest and most complete press factories in the world, with over 250,000 square feet of floor space devoted to production.

floor space devoted to production.

The photos above show part of the extensive facilities which enable Warco to produce the finest in all-steel welded presses and to render prompt satisfactory service to customers.

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Saved Time

by the boxfull

Reg.U.S.Pat.Off.



When you buy a box of "Unbrako" knurled Socket Head Cap Screws, saved time is thrown in that box with them. It's the knurled head that saves you the time . . . and money too. The knurling provides a slip- and fumble-proof grip, even for oily fingers, so the "Unbrako" can be screwed-in faster and farther before it becomes necessary to use a wrench. Order some "Unbrako" time savers today!

Pat'd. & Pats. Pend.



The "Unbrako" Socket Set Screw with the Knurled Point is a Self-Locker, because the knurled point digs-in and holds firm—against even the most stubborn vibration! Yet, this screw can easily be backed-out with a wrench and used again and again.

Both screws in sizes from No. 4 to 11/2", write for the "Unbrako" Catalog. "Unbrako" and "Hallowell" products are sold entirely through distributors.

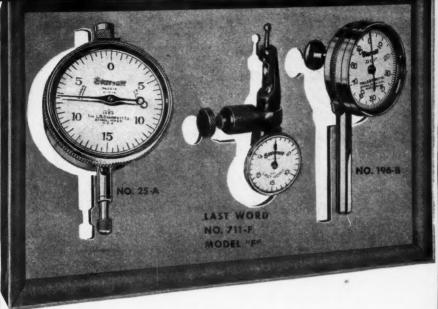
Knurling of Socket Screws originated with "Unbrako" in 1934.



STANDARD PRESSED STEEL CO.

JENKINTOWN, PA. BOX 556

BOSTON - CHICAGO - DETROIT - INDIANAPOLIS - ST. LOUIS - SAN FRANCISCO



These **STARRETT** Dial Indicators Fit Into Your Production Inspection Picture

By mounting appropriate models of these standard STARRETT Dial Indicators on tool spindles, production jigs or simple fixtures of your own design, you can "tailor to fit" countless production inspection applications. Each type has special ad-

946

vantages but all feature Starrett accuracy, and workmanship, clear, easy-to-read dials, maximum convenience in installation and operation. For details of the complete line of Starrett Dial Indicators, write for new Dial Indicator Catalog "MD."

THE L. S. STARRETT CO. • ATHOL, • MASSACHUSETTS • U. S. A

World's Greatest Toolmakers

STARRETT

PRECISION TOOLS . DIAL INDICATORS . STEEL TAPES . HACKSAWS
METAL AND WOOD CUTTING BAND SAWS . GROUND FLAT STOCK

Carburs PRODUCED BY MEN WHO KNOW CEMENTED-CARBIDES

Over a number of years, Lincoln Park's history has shown a series of "firsts" in application of cemented-carbides to the manufacture of gages and tools. One of these was the introduction of Carburs—industry's first cemented-carbide rotary files.

Today, Carburs have been thoroughly proven in every type of production. Original claims that their service life would be "at least 50 times that of steel rotary files" have, in numerous instances, been greatly exceeded. Every other claim

for performance and production cost reduction has been more than fulfilled.

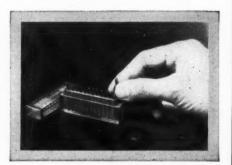
If you use rotary files, you'll find many advantages in those made of cemented-carbide. To be sure that you get the best, you'll find it will pay to specify the original cemented-carbide rotary files . . . manufactured by a company with unexcelled experience in cemented-carbide work . . . and that still rank far ahead in sales of tools of this type. They are Carburs—made by Lincoln Park.

MIDGET CARBURS

Carburs in midget sizes, 1 1/8 inches overall with 1/8 inch diameter shanks, are available for tool room, die shop, pattern shop and general production use. They are made of solid cemented-carbide.

Midget Carburs are supplied as individual tools or in sets of twelve tools of assorted shapes furnished in an extremely practical and attractive plastic case.

NEW LITERATURE SHOWING ALL CARBURS NOW AVAILABLE AND LISTING NEW REVISED PRICES WILL BE SENT YOU UPON REQUEST.







20% LOWER COSTS

This gray iron foundry was using a small wheel grinder weighing 2½ lbs.—17,000 R.P.M., 1½" x 3" x 1½" elastic bonded cone wheel—to clean recesses in exhaust manifolds. They called in the Rotor Application Engineer to suggest a faster method. He recommended the Rotor M-827 midget grinder—weighing only 1½ lbs.—20,000 R.P.M.—same wheel as before. The change was made. Results:

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1946

Grinding costs reduced 20% because of greater production due to:

1. Higher cutting speed of wheel on work.

2. Easier handling of tool (60% lighter). Easier to reach hard-to-get-at spots.

Also: Operators were happier because work was easier.

Why not ask the Rotor Application Engineer to analyze your portable tool operations and see if he can discover similar ways to reduce your grinding costs?

Yours for faster grinding,

AIR O'TOOL

ROTOR TOOL ...

CLEVELAND OHIO

HIGH CYCLE

NBIASED ANALYSIS OF PORTUBIT TOOL PROPERTY



...and you'll see why costs go down when Morse Cutting Tools go in!



As Always Through Distributors

See the length of these chips. Here's proof for you... the best kind of proof... that Morse Drills are accurately ground, uniformly angled, and have just the right amount of lip clearance. Try them! They'll cut down work and tool spoilage... reduce down-time... make a noticeable difference in your production costs!

TO REDUCE COSTS, SPECIFY MORSE CUTTING TOOLS

MORSETHERE ITAL

MACHINE COMPANY

NEW YORK STORE: 130 LAFAYETTE ST. CHICAGO STORE: 570 WEST RANDOLPH ST.

TO HANDLE COMPLEX TOOL GRINDING JOBS

EXTREME FLEXIBILITY
of the No.4 Universal Cutter and
Tool Grinder permits two ways
of performing nearly every
operation: 1. With the
spindle head locked, the sleeve
and knee swivel around the
column; 2. With the sleeve locked
the head swivels on the
column.

VERSATILITY of the No.4 Universal Cutter and Tool Grinder makes all of the following grinding jobs practical and simple:

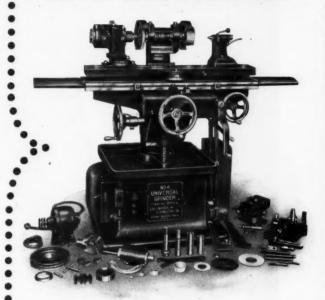
GEAR CUTTER GRINDING
ANGLE CUTTER GRINDING
INTERNAL GRINDING
CYLINDRICAL GRINDING
FACE GRINDING
FACE MILL GRINDING
END MILL GRINDING
FORMED CUTTER GRINDING
SURFACE GRINDING
HOB GRINDING

Write for Bulletin 544

with maximum speed and convenience

use G&L's GRAND RAPIDS No.4

Universal Cutter and Tool Grinder



CONVENIENT OPERATION permits control of machine from either front or rear. Power feed providing 6 longitudinal table speeds and wet grinding are available.

GRAND ENPIDS

-- CALLMESTER STONK CO.

GRAND RAPIDS, MICHIGAN, U.S.A.

What "GRAND RAPIDS" Quality Means: G & L cast their own close-grained gray iron, machine all parts to micrometric tolerances, and precision-assemble grinding machinery of unsurpassed performance. Grand Rapids means top quality in grinding machinery.

GALLMEYER & LIVINGSTON CO., 308 STRAIGHT ST., S. W., GRAND RAPIDS 4, MICH.

f for Morse

tool

ance.

TOOLS

S. A.

, 1946



United States **Savings Bonds**

Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Någara Squaring Shears. Also factory regrinding service by the same skilled men who grind new Niagara knives.

and Stamps

falo, N. Y. District Offices: Detroit, Cleveland, New York.

Shears because of accurate cutting, quick setting, ball bearing, self-measuring parallel back gages, full visibility of cutting line, instant acting Niagara sleeve clutch and other modern features. • Enclosed drive with gears, clutch and eccentrics running in oil assure long life and low maintenance cost. Four-edge, solid tool steel knives are standard equipment. Niagara Machine & Tool Works, Buf-

Plants are obtaining more production per man-hour with Niagara Power Squaring

SURFACES GROUND... TH ONLY I CHUCKING

ROBLEM To grind three surfaces, maining the two concentric i. d.'s pendicular to plane surface. This ground surface must be tight when assembled, with a erance of .0002". 2. Surface st be ground exactly perpenular to the annular (ring) sure, tolerance, .0002". Square mer must be ground without ess. 3. A 1" internal cylinarisurface on one half, 3/1 on other half.

Niagara knives.

and Stamps

N. Y. District Offices: Detroit, Cleveland, New York.

946

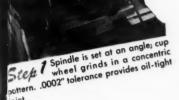
icint.



Step 2 This clutch part must have the thrust equalized throughout the internal, perpendicular surface which is held to .0002".



Step 3 Spindle speed is increased to 32,500 s.f.p.m. Small wheel is used for the internal shaft hole, tolerance, 0002".



PART: Overrunning clutch TA casing for a punch press. TERIAL: Hyt-M70 Carbon Steel 64 Rockwell). WHEELS: Nubon 0-K, 2" cup, 14,600 s.f.p.m. Carbodum E-60-P-100, 5%"x 1/4"x 1/8" 32,s.f.p.m. GRINDER: Dumore No. 5.

e's how Tools, Inc., Chicago, used umore No. 5 Grinder with excepally fine results. Finish and accuwere easily achieved, and there an actual reduction in working e. The Dumore Company, Tool ision, Dept. TF33, Racine, Wis. tern Sales and Service Branch, East 40th St., New York 14, N. Y.)

DUMORE NO. 5 MASTER PRECISION GRINDER

The 1/2 H.P. model is the most versatile of Dumore Grinders. 11 quick-change quills for .0001" accuracy, depths to 18" and %" to 1%" diameters. 5 interchangeable pulleys for speeds of 4,600 to 42,500 r. p. m.

> NO. 5 WITH B QUILL \$18250 F.O. B. PACTORY



DUMOREGRINDERS

> SOLD BY AUTHORIZED INDUSTRIAL DISTRIBUTORS IN ALL PRINCIPAL CITIES

Capacity...

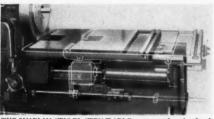
MARVEL 18 for Size, MARVEL 6A and 9A for Volume Production

With this battery of twelve No. 6A and No. 9A MARVEL High Speed Automatic Hack Saws, the Hammond & Irving Forge Co. of Auburn, New York, can cut-off billets automatically, not only in tremendous numbers, but in accurate weights and sizes to exactly fill each die without waste. With 12 of the "world's fastest cutting-off saws," they were able to keep all hammers running on their tremendous war orders, and were able to instantly resume peacetime manufacturing without re-tooling or other delay. The No. 6A and No. 9A MARVEL Automatics have capacities of 6" x 6" and 10" x 10" respectively.

In addition to the battery of MARVEL Automatics Hammond & Irving have cutting-off capacity of a different sort in their MARVEL No. 18 Hydraulic Hack Saw—capacity for size, because this roll-stroke giant cuts off billets and bars in sizes to 18" x 18" cross section. It easily handles the toughest and hardest steels.







THE SIMPLIMATIC PLATEN TABLE rests on and against bardened and ground steel ways and gibs. It has a fast, smooth traverse to and from cutting position, actuated by pneumatic cylinders.



VERTICAL HEAD TOOLING can be arranged instead of on berizontal platen table when desired. Here, too, you have maximum rigidity and solid support for tools right to the cutting edge. The heavy platen table of the Simplimatic automatically locks after it traverses to cutting position. Thus it and all the tooling on it become virtually one piece with the bed.

Because of the freedom in positioning slides on the big platen table, tools can be held close to their cutting edges and favored in any way desired. Moreover, this freedom from chatter is permanent because slide top is mounted on hardened steel ways and gibs.

Combined with the solidity of the cutting tools is the precision-fitted spindle of large diameter, on widely spaced roller bearings and its large herringbone drive gear mounted close to the nose. There's no chance anywhere for vibration. Chatter is designed out!

That's why Simplimatics can hold to extremely close tolerances, on large parts and at high production speeds. Ask for complete information about the Simplimatics.

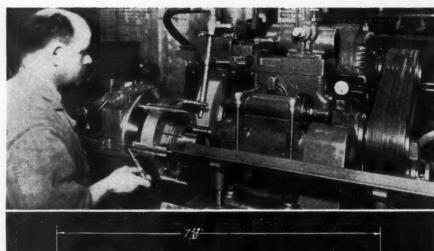
Look Ahead...Keep Ahead...with Gisholt

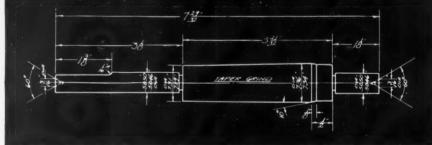


GISHOLT MACHINE COMPANY

1219 E. Washington Avenue, Madison 3, Wisconsin

TURRET LATHES . AUTOMATIC LATHES . SUPERFINISHERS . BALANCERS . SPECIAL MACHINES





ARTER for SHAFTS No. 135 Automatic Cylindrical Grinder

Automatic handling of work with plunge cut grinding. This highly productive grinder maintains concentricity of diameters as the work is ground on centers.

Name of part . . . Washing machine motor shaft.

Surfaces ground . . . three.

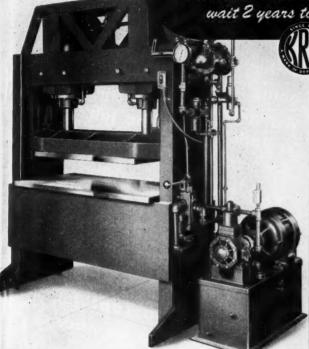
Production . . . 300 finished pieces per hour.

ARTER GRINDING MACHINE CO.

WORCESTER, MASSACHUSETTS . U.S.A.

FORMING PRESS Today

WITH THIS LOW-COST... SUPER-EFFICIENT
... LIGHT-WEIGHT BLANKING AND FORMING PRESS... and you don't have to
wait 2 years to get delivery.



Read these Specifications

KRW 80-TON BLANKING, FORMING AND STAMPING PRESS

• One of the soundest developments to come out of the war technology was the trend toward lighter and more efficient machine tool equipment. Startling proof of that development can be found in the new KRW 80-Ton Blanking and Forming Press. In this unit, KRW engineering experience has discarded tons of needless weight and cut thousands of dollars in cost from previous conceptions of this type of press.

All this has been done without any sacrifice

in operating efficiency.
These new KRW Presses can consequently be built and delivered in a matter of weeks, not years. They can be built with open or closed ends and with greater or less capacity than the one illustrated. Tell us what your problem is, and we will engineer a press to solve it. Mail the coupon for our new Hydraulic Press catalog.

K. R. WILSON BUFFALO 3, NEW YORK

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1946

SEND TOR

760 KRW

HYDRAULIC
PRESS BOOM

K. R. WILSON, 215-217 Main Street, Buffalo 3, N. Y	ť
Please mail me a copy of your New	



Bath Taps

If the work is "tough going" and you need a dependable tap --- put a Bath Tap on the job for satisfactory results.

Bath Taps are precision ground from hardened steel. They provide clean, accurate cuts at high speed.

Specify Bath Taps for long life and accuracy.

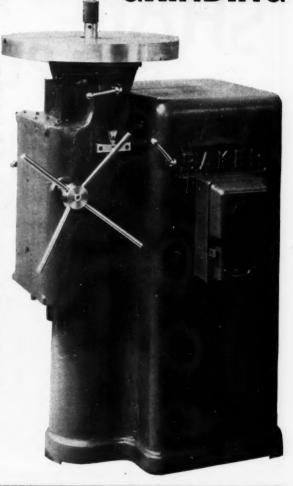
JOHN BATH & COMPANY, INC.

Model 3 Contour Grinder for RAPID ECONOMICAL ACCURATE GRINDING

Here's a simply designed grinder for hand grinding jobs which won't go on the ordinary machine. It's especially adapted for tool and die shops and tool rooms.

Capacity, diameter of wheels: ½" to 4". Capacity, face of wheels: 2", 2½", 3". Diameter of table: 18". Vertical reciprocating movement of spindle: 3/16". Reciprocating action provides better grinding action from the wheels; prevents shoulders from forming on the wheel; gives longer life to grinding wheels. Quicklymounted diamond dresser is standard equipment.

For complete details send for our folder.



BAKER Brothers, Inc.

Drilling, Boring, and Tapping Machines

TOLEDO, OHIO

SHAPER SHAPER

8-inch stroke hy-duty model

Shape-Rite Shapers are furnished with either plain or swivel tables. The swivel tables are very desirable for tool work and plastic moulds. They are completely flexible to handle any class of work within the capacity of eight inch stroke shapers with the highest degree of accuracy. All of the working surfaces are ground and hand scraped and each part is closely fitted to insure positive accuracy and longer life.



FOR COMPLETE INFORMATION
SEE YOUR LOCAL DEALER OR WRITE DIRECT TO US.

SALES SERVICE MACHINE TOOL COMPANY

2426 University Avenue

St. Paul 4, Minnesota

Higher Wage Costs!

How Staples can help you offset them with properly designed tools

To help offset today's higher wage rates, industry faces the need for higher output per man-hour—a continuous flow of good pieces right on down the production line.

Staples Carboloy-tipped Circular Cutting Tools, with their cemented carbide cutting edges, are the answer to today's problems of higher speeds, heavier cuts and greater precision. Staples Tools—with the hardest cutting edges known to industrial machining—mean less time out for resharpening, fewer visits to the toolroom, less down time on the line. And they give greater accuracy over longer periods of use.

When you switch to Staples Carboloy-Cemented Carbide Tools, standard or special, you automatically move in the direction of better balance between man-hour costs and man-hour output. Standard tools available from stock; special tools

designed to meet your special requirements. Ask your Staples Tools distributor, or write direct. Your inquiry will receive prompt attention.

ASK FOR NEW BOOK ON BETTER HOLE FINISH AT LOWER COST

 New 64-page Staples Catalog-Manual describes the full line of Staples Tools and includes illustrated instructions on how to use circular cutting tools for better results and lower costs.

THE STAPLES TOOL COMPANY
Formerly Staples Tool & Engineering Co.
CINCINNATI 25, OHIO



REAMERS • CORE DRILLS • SPOT FACERS • COUNTERBORES • END MILLS • SHELL END MILLS • ALSO A COMPLETE LINE OF CIRCULAR SPECIAL TOOLS

The Staples Tool Company, Better Hole Finish.	Dept: C,	Cincinnati 25,	Ohio. Send	your new	Catalog-Manual	on Staples Tools and
Name		*	Address		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
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WHEN WE SAY QUICK!

FOR QUICK PIERCING OF SHEET METAL USE A WIEDEMANN

Here's a typical example of how piercing time was reduced 90% by using a Wiedemann Turret Punch Press.

THE JOB: An order of 10 pieces 12% x 8½ x .078 mild steel (50 openings pierced requiring 7 different shapes and diameters)

TOTAL TIME FOR 10 PIECES:

OLD METHOD: 9 hours, 16 minutes
WIEDEMANN METHOD: 1 hour, 16 minutes
(Time includes loading and unloading
material in the machine)

TIME FOR 1st PIECE . . . 19 minutes, 18 seconds

TIME FOR EACH OF NEXT 9 PIECES . . 6 minutes. 39 seconds

The job was produced on a Wiedemann R-4P 11 Station Turret Punch Press with Drop-latch gauge. Layout work was done directly in the machine and is included in the above time.

You can see for yourself... when we say QUICK we mean QUICK. See a Wiedemann Turret Punch Press in operation. Write us for address of a shop in your vicinity that uses a Wiedemann for short run piercing at long run low cost... and send for Bulletin 92 for the complete story of short run piercing economy.







WIEDEMANN TURRET PUNCH PRESSES & GAUGE

Porter-Cable
Wet Belt Surfacer

A Production machine that also pays out BIG in Job Shops

Use it for:

- CLEAN-UP
- REDUCING STOCK
- SQUARING
- GRINDING RADII
- GRINDING FLATS
- BURRING

OFTEN DOES THE JOBS YOU'VE BEEN DOING ON MILLERS AND SHAPERS!

that Job

Does them faster, better, and cheaper. Does many jobs you've always needed fixtures for—freehand! Does others with only the simplest fixtures. Gives you a better surface, too—won't warp or distort the surface. Final finish frequently obtained on the initial cut.





There's no grinding tool so versatile as the PORTER-CABLE BBS, illustrated at left! Has platen for insuring true flats; line contact grinding done on front pulley. There's a spot for it in every job shop, and a need for it in almost every department of the largest plant.

WRITE TODAY FOR THE WHOLE STORY OF THE MODERN SURFACING METHOD

	ite 7	7	0
THE	WHOLE	STORY	OF
	THE MC	DERN	

POR	TER-	CAL	BLE	MA	CH	IN	E	CO.
300-6	WOLF	ST.,	SYR	ACUSE	8.	N.	Y.	

Name								 													 					
Company	Y							 . ,		,											 					
Address	*							 			*									 	 					
City								 . ,							3	a	rt	e		 						





. 1946

R-4P 11

gauge.

QUICK t Punch

shop in

end for



Whether your shop

IS SMALL OR LARGE, THE USE OF A REID PRECISION SURFACE GRINDER WILL BE OF GREAT VALUE TO ASSURE, (WITH A MINIMUM OF EFFORT) PRECISION RESULTS. TAKE ADVANTAGE OF ALL THE IMPROVEMENTS THAT ARE INCORPORATED IN REID MACHINES. NEW ILLUSTRATED BULLETIN GIVING FULL SPECIFICATIONS WILL BE SENT PROMPTLY ON REQUEST.

BALANCED DESIGN—ATTRACTIVE FINISH MODERATE COST.

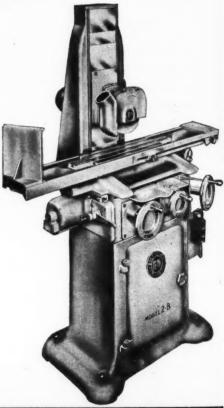
ILLUSTRATED IS THE REID MODEL 2-B ALL-ELECTRIC POWER-FEED.

THE REID MODEL 2-C HAND-FEED ALSO IS AN EXCEPTIONAL MACHINE FOR TOOL, GAGE, DIE AND CERTAIN PRODUCTION GRINDING.

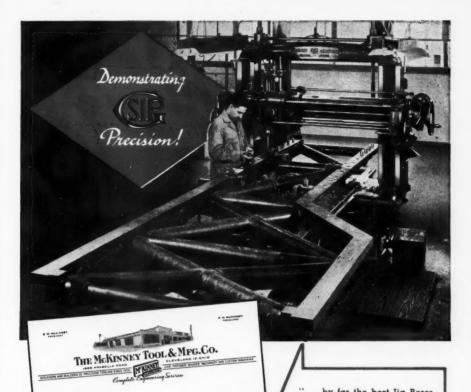
MACHINES EQUIPPED FOR WET GRINDING IF REQUIRED.

EXCELLENT DELIVERIES

DISTRIBUTORS CONVENIENTLY
LOCATED IN ALL SECTIONS.
WRITE DEPT. E FOR
ILLUSTRATED BULLETIN AND PRICES.



REID BROTHERS COMPANY, INC.



Cosa Corporation 5000 Chrysler Building New York 17, New York

We purchased a SIF Jig Borer in 1936 and have used this machine continuously ever since. During the war years it ran twenty-four hours a day, seven days a week.

Ever since we have had this machine we have had it checked every year and outside of a few minor adjust-ments, it has never caused us any trouble.

We halfers this maching to be by far the best 118 hours on the market. We do work on this machine that cause be done on any other 13g Borer. In fat we do easie to do course work for people with other 118 Borers, If we were going to buy another 11g Borer, we would buy no other kind.

Thanking you for your cooperation in the past, we remain

MCKINNEY TOOL & MP9. CO.

769 Kinney F. C. McKinney

"...by far the best Jig Borer on the market," says F. C. Mc-Kinney, who has put a SIP Jig Boring and Milling Machine to the severest test of continuous operation on jobs like the one shown above.

World famous SIP Jig Borers combine the high precision needed for toolroom work with the speed and dependability of set-up and operation that keep labor costs low—even on direct production.

RANGE OF TABLE SIZES

No.	2C							.18"	x	10%"
No.	3K							.211/2"	×	15"
No.	4G							.271/2"	x	235/8"
Hyc	lrop	ti	C	-	B			.391/2"	×	32"
No	50							A23/4"	-	22"

HIGH PRECISION MACHINE TOOLS

ORPORAT ON



AND MEASURING INSTRUMENTS

CHRYSLER BUILDING New York 17, New York



THE MOST FOR YOUR MONEY IN METAL-CUTTING

Completely
Automatic—Constant
Mesh, 4 Speed Transmission—
Angular Cutting Without Moving
Stock—Self Aligning Saw Frame—
6 x 6 or 10 x 10 Capacities.

Write for Details.

MAQUOKETA COMPANY

Maquoketa, Iowa



1886 MASON AVE., ROCKFORD, ILLINOIS

WRITE TODAY FOR MORE FACTS







This shows the quick hand-release for stock reel inh

MULTIPLE-SPINDLE DRILLING, BORING, TAPPING MACHINES . AUTOMATIC SCREW MACHINES . AUTOMATIC TRANSFER PROCESSING MACHINES

Upward in PRODUCTION



Don't let a curve in a piece of metal put your production on a down-hill slide! Instead, put an upward curve in production by the use of a Buffalo Bending Roll—as hundreds of cost-wise plant managers are doing!

Built in a complete range of sizes in vertical and horizontal models, Buffalo Bending Rolls form angles, tees, beams, channels or flats into rings or segments of circles—quickly, easily, cheaply. They bend metal cold to any desired radius.



If you haven't seen Bulletin 352-B which gives the whole story, send for your copy.

BUFFALO FORGE COMPANY

388 Broadway Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



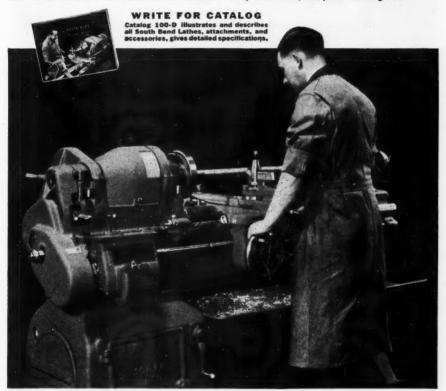
BENDING ROLLS

VERSATILE...

FOR A WIDE VARIETY OF PRECISION OPERATIONS

South Bend Precision Lathes offer special advantages to production shops, laboratories, and toolrooms that handle diversified work requiring a wide variety of exacting operations. They simplify change-over from one operation to another; help get new jobs into production quickly and economically. With their wide range of spindle speeds, they machine light metals, plastics, and steel with equal ease. A complete line of attachments and accessories enables

South Bend Lathes to handle many operations which otherwise might require special fixtures or machinery. Take advantage of this versatility, coupled with South Bend precision, speed, ease of operation, and dependability, to increase the capacity and efficiency of your shop. South Bend Precision Lathes are made with 9", 10", 13", 14½", and 16" swings, collet capacities to 1", and bed lengths to 12'. Write for fully illustrated, complete Catalog 100-D.







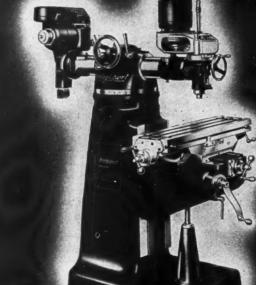
SOUTH BEND LATHE WORKS
427 EAST MADISON STREET . SOUTH BEND 22, INDIANA

Bridgebort

TURRET MILLING MACHINE

THE INIDGEFORT TURRET MILLING MACHINE has wen universal acceptance. It has proved a most valuable time and labor sever in the tool rooms and production departments of the largest plants. Its wide rongs and versatility in milling, deliling, boring and shaping enable it to serve as the complete control machine around which all operations revolve in many small shape.



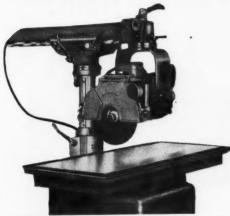


BRIDGEPORT MACHINES, INC.

52 REMER ST.

BRIDGIPORT, CONN.

WALKER-TURNER MACHINE TOOLS cut Production Costs . . . 4 WAYS!



W-T RADIAL CUT-OFF MACHINE. Cuts at any angle.



(1) LOW FIRST COST

W-T low prices are a direct result of sound engineering, manufacturing know-how and volume production.

(2) LOW OPERATING COST

Compact, rugged construction. elimination of unessential weight, keep power and maintenance costs low.

(3) WIDE SPEED RANGES

Selection of correct cutting speed for each material provides maximum cutting efficiency.

(4) MULTI-PURPOSE DESIGN

Adaptable to a wide variety of operations — in standard or special set-ups - in single or multiple installations—solving troublesome tooling problems at low cost.

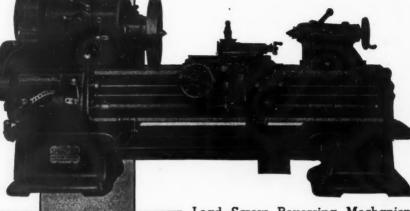
-W-T RADIAL DRILL. Speed range 110-8300 R.P.M.

WALKER-TURNER CO., INC.

PLAINFIELD, N. J.

DRILL PRESSES - HAND AND POWER FEED . RADIAL DRILLS METAL-CUITING BAND SAWS . POLISHING LATHES . FLEXIBLE SHAFT MACHINES RADIAL CUT-OFF MACHINES FOR METAL . MOTORS . BELT & DISC SURFACES

PRINGFIELD PRECISION LATHE Out in front!



SEND TODAY FOR BULLETIN No. 161

Tells the why and how of Springfield's accurate production. Lead Screw Reversing Mechanism produces right and left hand threads and feeds controlled by Lever at right hand side of apron, with automatic stops for both Lead Screw and Feed Rod.

Lead Screws are made from high carbon steels, manufactured and tested to .001 of an inch to the foot and are only used for thread chasing, as a Feed Rod is supplied for all feeds. 36 changes of threads and feeds are obtained.

Get out in front with a SPRINGFIELD Precision Lathe.

THE SPRINGFIELD MACHINE TOOL CO.

SPRINGFIELD

OHIO. U. S. A



You probably have heard about the Rockford Hy-Draulic Machines...how hydraulic drive and feed combine to give you overall operating advantages that are rarely duplicated. Now is your chance to read the full story about one of these machines, the Rockford Hy-Draulic Openside Planer. Completely illustrated and clearly described are the facts about design, construction, and operation that show why these machines are good for all jobs in their field and better for most. Judge for yourself... make this information a permanent part of your reference files ... write for the new Rockford Hy-Draulic Openside Planer Bulletin 1633



ROCKFORD MACHINE TOOL CO., ROCKFORD, ILLINOIS



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Hardened steel parts, bearings, connecting links, and other parts going into their sewing machines have been honed for several years at the Chandler Machine Company of Ayer, Mass.

Tolerance is held within .00025" with a very smooth mirror finish on the honed surface. Previous to using Sunnen honing, these parts were lapped — and copper laps were constantly wearing out, leaving bell-shaped holes. In addition to spoiling materials, lapping was

costing them a great amount of unnecessary production time.

Now, the Sunnen Precision Honing Machine is giving them smoother finishes in more accurate holes at least five times as fast.

If you have an internal finishing problem on which you need greater accuracy — or more speed — or a smoother finish, ask a Sunnen engineer to call, or write for a free bulletin giving complete details of Sunnen Honing.

SUNNEN PRODUCTS COMPANY

7933 Manchester Ave., St. Louis 17, Mo. . Canadian Factory: Chatham, Ontario

Typical Jobs



Cast Iron Valve Stem Guide. 1/2 to one thousandth removed — 220 pieces per hour. Better finish and straighter hole.



Carbureter Idler Valve Jet. Hole is honed after reaming for smooth action.



Stainless Steel Load Compensator Valve Seat. Hole is honed to .0002" limit,



inner Bearing Ring "Accurately removes Jast 'tenth' of stock,"

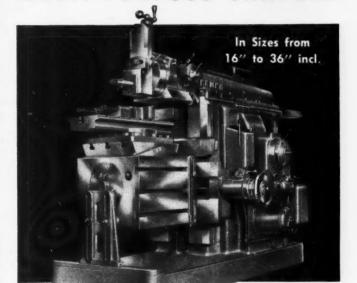


Diesel Engine Fuel Injector Cylinder "So accurate that a piston can be fit within ,00005 inch,"



One of the Outstanding
Qualities of Caracterist

MULTI-PURPOSE



GENERAL ENGINEERING & MFG. CO.

ST. LOUIS 4, MO.

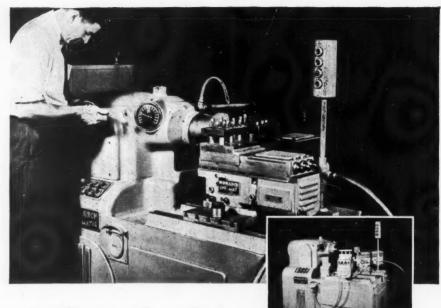
1946

Several hundred users were recently asked: "What do you like most about GEMCO Shapers?" RUGGEDNESS was voted one of the most outstanding features. Because of this powerful construction, GEMCO Shapers have exceptional rigidity, stamina, and ability to "take it". Hence, they are extremely accurate, giving all work a precision finish.

SHAPERS

The Universal type of GEMCO Shaper, shown here, is ideal for tool and die work, or where angular setups are required. Its exclusive "Lubrigard" Safety Device increases the precision life.

Manufacturers of Precision Machinery Since 1917
Write today for Bulletin GC-12 S



You'll get peak production AT A PROFIT - with the Uni-Matic*

Spindle speeds up to 5000 RPM. Completely automatic cycle, electronically controlled. Independent-motor-driven interchangeable tool slides ("Uni-Mats") you can position universally, tool universally.

These are just a hint of some of the revolutionary features you'll find in the Uni-Matic . . . for chucking and fixture work as small as 1" and as large as 16" diameter. It's the machine that brings automatic production within reack of every shop, no matter how large or how small the lots.

You'll get minimum machining costs as only you can with specialized automatic production. Best of all, when you change your design you don't change Uni-Matics. Just tailor the tooling to fit your new operation—it's only a few hours' job. The Uni-Matic is universally adaptable.

*UNI-MATIC -Add this new name to your metal-turning diction-ary—you'll be hearing a lot of it wherever rising production costs are a factor. The Uni-Matic is Monarch's answer to this problem in the field of chucking and fixture work. For be-tween-centers work it's the Mona-Matic: for hand screw machine work, the Speed-Matic.

Get full details on these three new machines now-from your nearest Monarch representative—or write 112

The Monarch Machine Tool Co. Sidney, Ohio





946

THE TAPT-PEIRCE MFG. CO., WOOMSOCKET, R. I.

E. V. M. Neatro 6-6-2 finishing cuts. All of the above steels are available

Red Cut Superior

America's favorite high speed steelfor all cutting purposes.

For fine cuts and hard materials—higher carbon and vanadium content.

Red Cut Cobalt

For hogging cuts, fast speeds, hard or scaly materials, etc.

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Provides the highest attainable cutting ability in a high-speed steel.

Remarkably wear-resistant, delivering top performance on abrasive materials

For fine edge tools and finishing cuts Wide hardening range.

Vasco M-2

A tungsten-molybdenum general purpose steel, particularly adapted to fine

Victory Cobalt

For heavy duty cutting of heat treated steel, cast iron, etc.

ts, bars, cold drawn shapes, solid forgings, ring forgings, ales, and drill rod.

*One of the series of six Vasco Tool Steel Classifications covering every industrial requirement.



STEEL COMPANY LATROBE, PENNA.

Colonial Steel Division . Anchor Drawn Steel Co.



Do you thread parts on a production basis? Then you'll be glad to know that this No. 16 Geometric PRECI-SION Threading Machine is again available. It is easy to set up and operate. It is sturdy, fast and accurate. It cuts threads up to 1" diameter (N. C.) and 1½" (N. F.). The No. 16 Geometric PRECISION Threading Machine has lead screw and vise type chuck as standard equipment. Lead screw can be disengaged for

vices can be used. This machine is tops for quantity production of duplicate threaded parts. Write for details today.



ARLY EVERY THREADING

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hard or

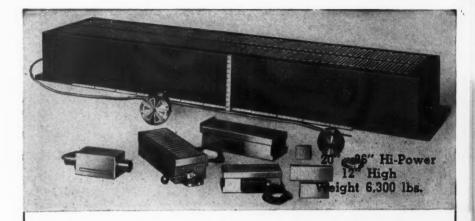
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WHAT IS YOUR PROBLEM?

- The above display illustrates the diversified demand for WALKER CHUCKS.
- Increase your Productive Efficiency by the use of WALKER MAGNETIC CHUCKS.
- Less fatigue on the part of your operating personnel.
- Submit your problems to WALKER engineers for successful solution.

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Also Permanent Chucks.

STAINLESS STEEL MILLING

Made easy on a Kearney & Trecker CSM

Plain CSM

946

THE JOB

Stainless steel is difficult to mill under almost any circumstances but this super-powered CSM, equipped with the proper cutter literally "walked through" this job.

OPERATION: Rough Mill Stud MATERIAL: Stainless Steel CUTTER: 6" Dia.; 8 Tooth TABLE FEED: 21 IPM SURFACE SPEED: 346 SFM -DEPTH OF CUT: .441" (Max.) FEED PER TOOTH: .020" MILLING TIME: 26 Seconds



STAINLESS STEEL STUD

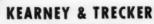
Note the excellent finish obtained despite the high rate of metal removal. The milling time of 26 seconds includes both surfaces. Micrometer stop dial indicator on machine facilitated this step milling operation.

CSM Milling Machines were designed to obtain the greatest benefits from modern cutting tools, and are now part of our line of standard models.

Knee type machines, they are readily adaptable to a great variety of work. They are precision built in accordance with long established Kearney & Trecker standards, and will cut metals faster and to finer tolerances and superior finishes than ever before, with high speed steel cutters as well as carbide cutters. Available in 20, 30 or 50 H.P. models in both plain and vertical knee types.



Write for complete data on CSM machines — CATALOG CSM-20. Please indicate your business connection.

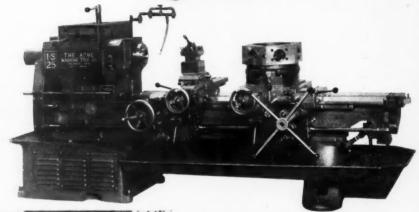


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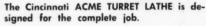


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ACME Turret Lathe unexcelled for Low Cost machining of Gate Valve Parts







Complete machining of VALVE STEMS.
Rolling in of VALVE SEAT RINGS.
Machining of VALVE BODIES.
Machining of WEDGES.



No. 15-25" FIXED CENTER UNI-VERSAL TURET LATHE—Special tooling for rapid production of VALVE SEAT RINGS. An air controlled holding fixture eliminates possibility of distorted ring when clamping. Adjustable overhead turning heads provide quick means for setting cutters with minimum overhang on various diameter rings.



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Send your problems to our Engineering Dept.

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the most accurate and economical athor of measuring tooth thickness external and internal spur gears, so it may be applied to helical ares.







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Catalog No. 33 is a manual of precision measuring systems, giving complete tables and simplified formulas for measuring standard and special threads, splines, gears and worms. Send for Catalog 33 and Circular G 37.



SIMPLE! The only calculation required is one of simple division.

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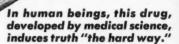
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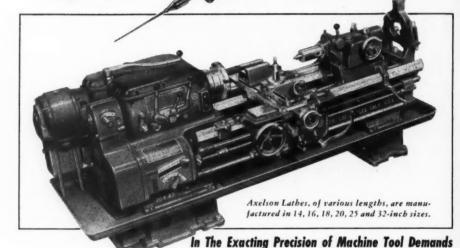
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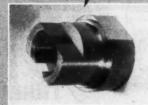
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Lathe Tapping and Threading

MADE IN 2 SIZES Giant (Right) For engine lathes.

Capacity from 10-32 to 34" S.A.E. for external threading. Thread length to 5½". Tapping from 10-32 to 3/"-11 with 2- or 3-flute spiral taps.

REGULAR SIZE shown in line drawing below.



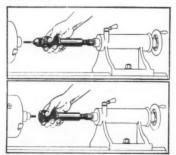
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After slow, old-fashioned methods, you will appreciate the high cutting speeds, the ease and accuracy which the GRIP-SLIDE tool offers. It will soon pay for itself many times over. Threading and tapping with the GRIP-SLIDE tool are simple: Insert the die or tap, grasp the tool as shown in illustrations, slide it to the work. When the desired length has been reached as shown by the quarter-inch ring calibrations on the guide

"REGULAR"

For bench and small engine lathes. External threading from 2-56 to %" on steel. Thread length to $3\frac{1}{6}$ ". Tapping from 2-56 to $\frac{1}{6}$ " with 2- or 3-flute spiral taps.



bar, release your grip, reverse the lathe, grasp tool again and it will back off. There's no time lost shifting tailstock or tailstock spindle! Run the lathe as fast as you want. There's no danger of a spinning die-holder handle. Concentric tool holder bores, accurately fitted to the guide bar, all hardened and ground, insure true threading. Write for complete details.

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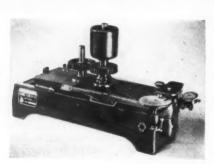
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SCHERR TIME-SAVING SPECIALTIES will aid your shop back to normal and profitable production. Many of the items





profitable production. Many of the items missed for years are back again. Send for illustrated bulletins listed below.

WIINFR PROIFCTOR

Throws a magnified image of an actual part against an enlarged master drawing. instantly showing if part is inaccurate, and how much. Permits control of a production job from start to finish-insures correctness of tool forms, checking of gages, correctness of tool adjustment at start of production, spot inspection to detect tool wear as work progresses. With the Wilder Projector, the last piece on the run as well as the first, will be well within tolerance limits. Operation of the Wilder is so quick and simple that many shops use it for 100% inspection. Priced within budget of any shop. Write for the bulletin.

GEAR

for spur, spiral, worm and bevel gears. Recognized everywhere as the direct method to detect errors in gears right in the shop before costly rejections occur. Sensitive floating carriage riding on balls shows eccentricity of pitch line, incorrect center distance and backlash, errors in toothspacing and involute, off-center condition of teeth, etc. Spinning two mating gears by hand on the stationary non-revolving arbors tells the experienced operator whether gears will run without vibration or noise.

A RECORDING ATTACHMENT using 4" diameter waxed paper discs (no ink or liquids) can be furnished for reference should complaints arise after gears are installed. Often a gear is unjustly blamed when the wrong center distances in the housing, poor bearings, etc., may be the cause. PARKSON GEAR TESTERS are turnished in ten sizes for gears from 14" to 36" center distances. Write for full details.

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WILDER PROJECTOR—compares a magnified image with a master drawing of the part, instantly detect-

CO., Inc. 198 LAFAYETTE STREET

Industry Acclaims the WORLD'S FASTEST VISE



CUTS JIG AND FIXTURE COSTS 75% SPEEDS PRODUCTION

Engineers incorporating the Heinrich "Grip-Master" in jigs and fixtures for drilling, tapping, milling and assembling operations save up to 75% of tooling costs. A push on the center bar knob . . . a press on the locking lever, gives fast, unbreakable grip. SCREWLESS feature cuts operating time unbelievably. Bushing plates and locating jaws, made in your toolroom, are easily attached to cast bosses. Four sizes fill all needs.

An example of how "Grip-Master" is used in drilling Jig and fixture design.

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A postal card brings an illustrated folder with complete details of Heinrich "Grip-Master's" amazing, cost-cutting features.



NATIONAL MACHINE TOOL CO., Dept. 116-F, RACINE, WIS.

The New HARDINGE High Speed Precision Second Operation Machine



The above features assure sustained accuracy. The performance features of the previous model have been retained. This is the outstanding machine for high speed production of second operation work. Ask for bulletin DSM 59.

HARDINGE BROTHERS, INC., ELMIRA, N. Y.



The 151 Piace Assortment No. 6151T, above, is typical of the many other balanced sets in the New Britain Line that put the right Tool at hand at the right time.



There's ample reason for the wealth of knuckle and job insurance in a Set of New Britain Hand Tools: Careful Engineering insures its famous versatility; Precise Manufacture guarantees rigid quality control; Accurate Heat Treating of the finest selected alloy steels provides extra active strength when and where it's needed.

hard jobs easy!

No doubt about it... there's a New Britain Set that just naturally holds the RIGHT Tools for your maintenance and repair jobs. Ask your Mill Supply Jobber to show you one of these money-making Sets—TODAY. The New Britain Machine Co., New Britain, Conn.

Many Brilling

GREATER STRENGTH . BETTER FIT

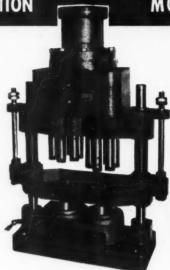
BUHR Specialized DRILL HEADS

MORE PRODUCTION

MORE PROFITS!

Proper tooling up means More Production.

MULTIPLE SPINDLE DRILLING



Built by Buhr means Greater Profits.

REAMING BORING TAPPING

DESIGNED BY BUHR BUILT BY BUHR

This typical retooling job built to solve a mass production problem includes:

- 1—12 Spindle Head (6 for drilling and 6 for reaming) 1/8" holes. Spindles have in and out adjustments for drill wear.
- 1-Bushing Plate.
- 1-2 place Holding Fixture.

NO DOWN

All Buhr Gears are shaved and Induction hardened for quieter, frictionless operation, lower power consumption and more production without "Down Time."

Write us about your Problems or Send blue prints to us . . . We will give you the comment.

BUHR Machine Tool Co.

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This 12,500% increase



But True!... In crush form grinding a modified butress thread form on the new Thompson Truform Grinder it was possible to increase production 12,500% without disturbing the set-up!

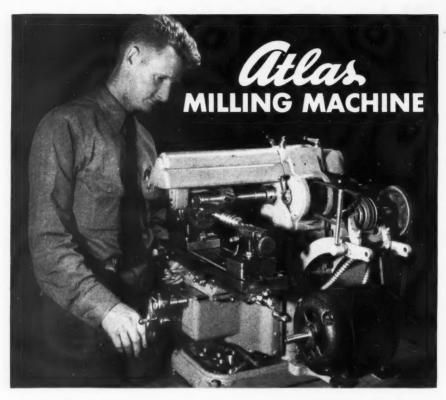
The secret of this achievement lies in the fact that Thompson Truforming involves a machine engineered and built as a single unit and uses two crushing rolls . . . a "work roll" and a "reference roll." Whenever the "work roll" loses form, the original degree of accuracy is quickly transterred from the "reference roll" back into the grinding wheel and then reground into the "work roll" . . . all without disturbing the set-up.

In this way the "work roll" can be re-processed whenever it loses form and can be used for hundreds of additional dressings, or until it is worn out. In the example mentioned above, it was possible to get over 15,625 additional dressings from the "work roll". This means an increase in continuous production of 12,500%.

So many people have asked about the details of this new Thompson process that a special 8-page leaflet has been prepared with diagrams and answers to questions about Truforming. Just write for—"Tell me about this process," Address Dept. 13.

THE THOMPSON GRINDER COMPANY
SPRINGFIELD, OHIO





Cuts Machine Hour Costs On Small Parts Milling

The Atlas milling machine is one sure way to meet the production-cost challenge of rising labor rates. Its original cost is low. It requires but a 1/3 HP motor. It handles the full range of small parts milling with the precision and dependability of larger machines.

The table is $4\frac{1}{2}$ " x 18" and travels 10" longitudinally and $3\frac{1}{2}$ " cross-table. Eight spindle speeds from 62 to 2870 RPM provide correct surface speeds for all types of work and cutters. Choice of manual, lever, or Change-O-Matic table controls. When you add air chuck and control devices it becomes a semi-auto-

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The Atlas milling machine is part of the Atlas 4 Tool Team designed to "match the machine to the job" for greater speed and efficiency on small parts operation. Send for latest catalog with complete specifications and operating views.

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WITH PRODUCTION

Easy to operate . . . simple to set up...the ACE keeps the work before the eye with no bending . . . no squatting . . . no squinting . . . saves the operator from work fatigue. Keeps production going.

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NEWS

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THE COST IS REDUCED



THE QUALITY IMPROVED

IT'S UNBREAKABLE

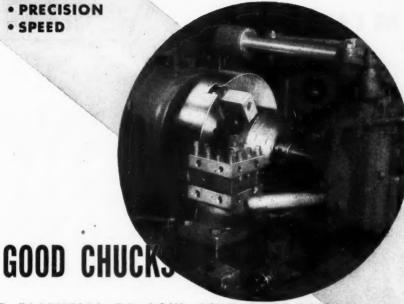
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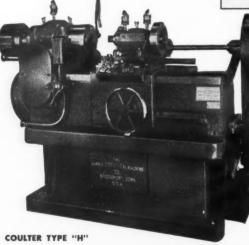
CUSHMAN CHUCKS

S A V I N G MINUTES

WHEN MINUTES COUNT

WITH A
COULTER
HOB THREAD
MILLER





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Unlimited capabilities for either right or left - hand threads—Internal or external.

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 Over 75 models. One, two, three and four spindle types. High and slow speeds; bench or floor type; slotted or oil trough table.
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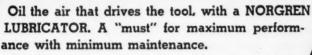
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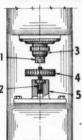
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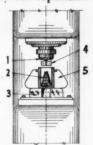


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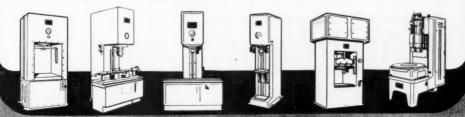
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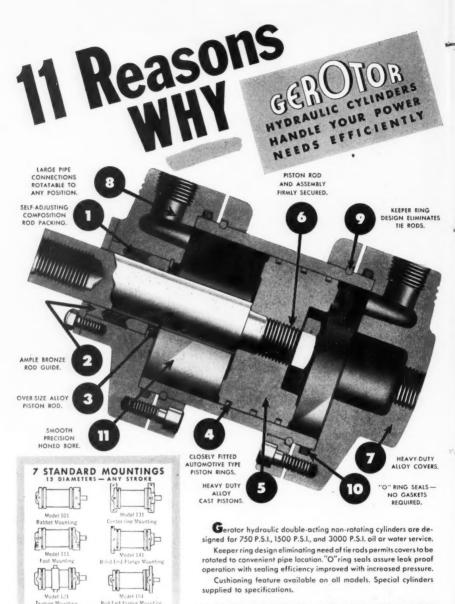
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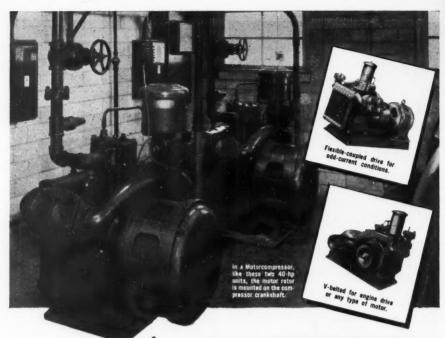
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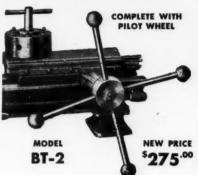
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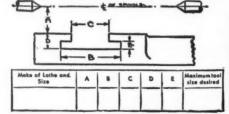


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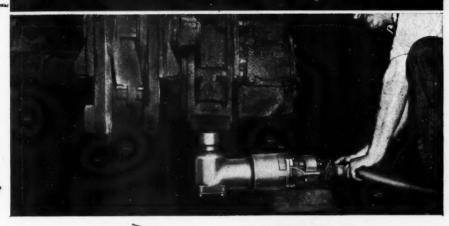
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Machine Shop 7

HOWARD CAMPBELL, Editor

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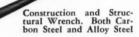
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Machine Shop

JUNE, 1946

Vol. 19, No. 1

CINCINNATI, OHIO

This Month

The letters that have been received asking for additional information on engraving equipment and methods as a result of John Hyler's first article on "Engraving Machines and Work", which appeared in last month's issue, indicate a widespread interest in this subject. Accordingly we are glad to present the second article of this series in this issue. Page 124.

The savings that can be effected through the salvaging of scrap metals and oils and other industrial scrap is always an interesting subject because of the wide variety of methods in use and the lack of standardization on salvaging methods. In the article "Scrap Salvaging Effects Savings", on page 136, Stephen Porter Lathrop presents an outline of the methods employed in the United States Naval Ordnance plant at Chicago for the salvaging of scrap metals, oils, greases, rubber, paper, and other industrial waste. The discussion should offer some good suggestions to the plant manager who has this subject under consideration.

The Willey-Wray Electric Company, Cincinnati, Ohio, hasn't had any labor difficulties in the past twenty-six years—and of course there is a reason. We have been very fortunate in being able to get F. W. Willey, president of his company, to give us an outline of the platform upon which his company and its employees get together. You will find it on page 158.

The pressure of war necessity produced many new and interesting developments in the aircraft manufacturing field, among which was the high strength plastic known as "Plastiform." The technique of handling this material and the uses that have been made of it are discussed in the article "Plastiform—Reclaimable Tool Plastic" by Thomas A. Dickinson. Page 174.

Included in the Ideas from Readers are a "Combination Cathead and Steadyrest", "Greasing Device for Power Conveyor", and other interesting developments.



Using a Gorton Three-Dimensional Pantograph to reproduce a Lincoln medallion; the job is done with this machine in a small fraction of the time that would be required by hand engraving methods. The Pantograph is used to reproduce relief work for embossing dies, reverse models for recoining dies for metal badges, medals, and so on. In the case illustrated, the master is enlarged 3:1, which provides for accuracy on fine details. (Photo Courtesy George Gorton Machine Co.)

By JOHN E. HYLER

Engraving Machines and Work, II

Engraving letters, figures and other characters—Uses of masters—Three-dimensional work

W HAT has been said to this point regarding the different types of engraving machines and equipment used with them for vertical actuation of the cutter spindle may be regarded as elemental and basic in modern engraving machine practice. It will be of interest to consider a number of

other factors. The kinds of work that can be done are great in number, there being literally hundreds of different applications.

In addition to engraving numbers and letters on various parts for different purposes, such machines are used in engraving the characters on steel

stamps, which in turn are used for marking other products. The machine is used to engrave figures on celluloid dice. Letters, figures and other characters are engraved on rubber stamps and dies. The necessary figures, letters, and so on, are engraved on and in embossing dies. With particular regard to dies, engraving of figures and letters is only a small corner of the work performed by machines of this kind. All kinds of intricate cutting is handled in die work. Some machines of the pantograph type are particularly designed for production of standard dies and molds by the copying process, and are therefore referred to as die duplicators.

Engraving machines have been de-

veloped for particular types of work. Some are intended chiefly for die duplication, and for very close duplication work required on punches, cams and gages that must be highly accurate. This type of machine is also ideal for the reproduction of type in steel stamp production.

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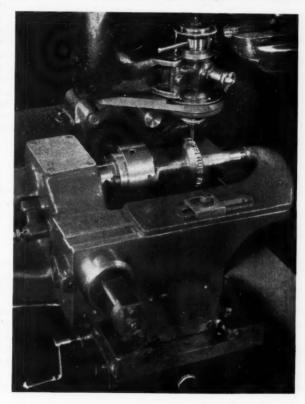
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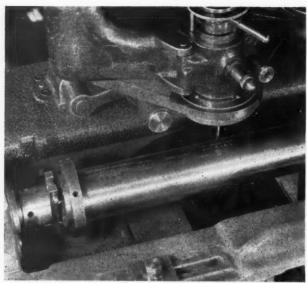
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Another type is a large heavy duty unit suited for high speed engraving on large flat or spherical surfaces. It has been found especially useful for cutting large figures or letters in heavy embossing dies such as are used for production of road signs, license plates, and similar work. It is also very useful in profiling thin steel parts to close tolerances. Some small machines are meant for small, delicate jewelry dies and like work. Others are designed to permit engraving over a wide area, and are particularly suitable for engraving instrument panels and other such items.

Easy working of the pantograph, along with the necessary amount of rigidity incorporated, is of importance, as can readily be understood. On two-dimensional machines, two simple adjustments only are required to obtain



Roll Engraving Attachment applied to a Pantograph Engraving Machine. The use of the attachment eliminates the need for a forming guide, being so designed that it rotates the work automatically, at the correct rate, by the lateral movement of the guide over the tracing copy. The work shown in the machine is a rotary lettering die upon the periphery of which letters are being cut. (Photo Courtesy George Gorton Machine Co.)



Engraving of cast iron Engraving of cast fron textile printing roll 2% inch diameter by 13 inches long, using a Gorton 3-U Pantograph with roll attachment. The pattern, or "master," is flat and is triple the size of the finished engaging. the finished engraving.

any desired position or reduction. On three-dimensional units, four adjustments are required, but they are simple and very easy to understand. As made by leading manufacturers, pantographs are full ball bearing, so they offer no frictional resistance though they are kept quite rigid so far as any lost motion is concerned. On larger engraving machines made by this firm. increased sensitivity in the pantograph has been obtained through making it as light as possible. Some of the movements of a pantograph are in large degree of reciprocating type. On one three-dimensional machine in mind. pantograph bars are made of heattreated aluminum alloy.

Master Copy Type

Since engraving of letters, numbers and similar characters is such a highly important section of engraving machine practice, it is of interest to know what has been done along this particular line. Manufacturers of engraving units carry large stocks of standard kinds of master type on hand, so they

can fill any ordinary requirement promptly. Three basic forms of type are used with engraving machines. one is the sunken Vgroove, which can be simply followed by a style or tracer having a 90-degree included-angle conical point, Another is the

sunken square-bottomed letter which, when it is cut into a surface, produces a shaded-lettering effect. The other and third form is raised on relief lettering. For these last two forms of lettering a roller is often used on the end of the tracing style. Letters are made both plain and reversed. Reversed lettering must be engraved into the dies, molds, or other work.

There are, however, a number of different kinds of type that can be obtained, including vertical, inclined, script and Old English. Different series of master copy type have been especially designed for use in connection with cutting steel stamps. These are only a few of the many different type items that are obtainable. Numerals and fractions of different kinds can be had. Numbers and type to be engraved on work are often handled by using master copy dials, on which the required numbers are already combined in convenient form, and the required characters can be indexed into place as needed. Master copy dials of different kinds are provided by manuSharpening engraving tools or "gravers," using an Arkansas bench stone. (Courtesy Behr-Manning Corp'n.)

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facturers of engraving machines. Some of these dials are standard; others are made up to order as required.

Micrometer thimbles are graduated and numbered in some cases, with the aid of such a master dial, on the engraving machine. Roll dies, numeral wheels, roll stamps and rotary tables are engraved with the

aid of such master dials. The dial method is also used in some cases for engraving on flat surfaces of scales, rules and similar work. Where special clock dials are to be engraved, they can be handled in like manner, and some master copy dials are used in connection with engraving transit limbs, and similar instrument work.

Characters Engraved in Formation

Different means are employed with the engraving machine for engraving letters, numbers and other characters in some given kind of formation, and also for cutting true radii on letters in circular formation. Wherever circular formation is involved, the use of a circular or rotary table is one of the main answers. Such tables are available which are especially suitable for use with the engraving machine. However, in some cases extra set-ups are required for the use of a circular table, although this may be avoided in some instances through the use of graduated circles. A master is made up by cutting a large number of circular sunken V-grooves, all concentric, and spaced or graduated 15-inch



apart. The innermost circle is only ¼-inch in diameter, and the outer circle, 6 inches in diameter.

Another possibility that should not be overlooked is the use of so-called skeleton type letters. These can readily be obtained, but can only be used for the production of relief lettering. They are usually cut from engravers brass, and are mounted on a back plate by the user to form a master. Therefore they can be mounted in various circular, oval or other formations to suit the taste of the individual manufacturer.

In making a master with such letters, considering that it will only be needed temporarily, the letters are attached to the back plate with molders wax. The wax is flowed over the plate with a gas or electric burner or with an alcohol torch, and the letters are pressed into place while the wax is still soft; when one is through with such a plate the letters are readily removed by heating the plate. In making a permanent master copy with such letters, they are sometimes screwed to the plate, sometimes riveted, and sometimes are sweated on with solder.



Various Kinds of Masters

Just as a consideration of the temporary or permanent aspect of work to be done will influence the manner in which skeleton-letter masters are made up so the provision of various kinds of masters in engraving machine work will be influenced. Obviously, there is no good point served in going to a great deal of trouble to make a master with superior enduring qualities, when it is known in advance that it will only be used once or twice. It is just as poor judgment to make a master that will not withstand a great deal of wear, if it is foreseen that it will be used often and long. Where materials to be engraved are fairly soft, as in the case of hardwood. Bakelite, fiber and sometimes brass, masters have been made from ordinary Bristol board. However this practice is not recommended where extreme accuracy is required, or where the master will be used extensively.

In using Bristol board, the design may be directly drawn upon or transferred to the board. Using a small knife, burnisher or other hard steel tool, with the end ground to a 90-degree included angle, and with the point pulled sufficiently that it will not actually cut the board, run carefully over the lines with it, putting on sufficient pressure to form a well-defined groove about 1/32" deep. Then

Wallpaper roll engraved by the use of a pantograph engraving machine. The intricacy of the design and the accuracy with which it must compass the periphery of the cylinder is self-evident. (Courtesy George Gorton Machine Co.)

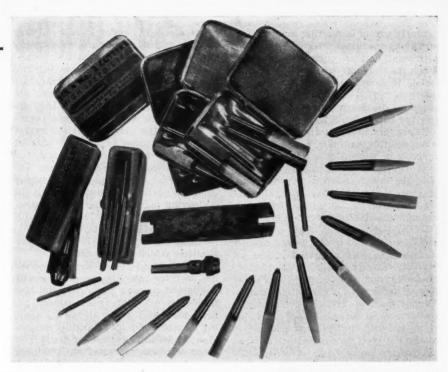
sharpen the lead in a hard lead

pencil to the same 90-degree included angle, and go over the groove with this pencil point. This will smooth the groove. The graphite also forms a dry lubricant. Then give the entire Bristol board master a coat of shellac, to provide added stiffness. Always make a Bristol board master three to ten times larger than the engraving that will be made.

By using a 45-degree angle hollowground hand graver, lines can be cut into transparent celluloid to advantage: thus celluloid can be used for making an engraving machine master. Such celluloid can be obtained, it is believed, from leading manufacturers of drawing instruments, since they use it for making triangles, French curves; and similar tools. There are other ways in which hand gravers can be used to advantage in making engraving machine masters, and it is interesting to know that some of the leading file manufacturers provide full lines of hand gravers.

A great advantage in making a master from transparent celluloid is that it can be laid directly down over a drawing on the board so that the necessary grooves are engraved into it directly over the lines in the drawing. The masters thus obtained are suitable for light cutting in steel, the making of jewelry dies, and comparable work

Linoleum, too, of the kind used by



A complete assortment of single-flute cutters and small accessories for use with pantograph engraving machines equipped with taper shank spindles. Two Midget chucks, used for very delicate milling and engraving (one in the box labeled 21-1 collet) are included.

(Courtesy George Gorton Machine Co.)

artists in making block prints, can be successfully hand graved and used in making engraving machine masters, but where linoleum is used, a roundnosed graving tool is employed rather than an angular one. It should be understood that the stylus or tracer to be used in the engraving machine should have the same shape on the point as the groove it is to follow, whether that be angular or roundbottomed. Either a linoleum or a celluloid master should have a moderate amount of oil rubbed over the grooved face when in use, as this will aid the stylus to slide smoothly and make for smooth work.

Early in the first article we men-

tioned the possibility of using zinc etchings made directly from drawings as engraving machine masters, and that such will serve for reproducing raised patterns of intricate design in steel dies, for the lines on the etching are raised and will therefore reproduce as raised lines on the die surfaces. It is important to see that there are no ragged edges on the lines of such etchings before they are actually put to use. Any ragged edges found should be carefully trimmed.

Dow metal is now available in sheet form from the manufacturers, and because of its relative softness, allowing it to cut more freely than either aluminum or brass, it has been found particularly useful in making masters for engraving machines when deep cutting with small delicate cutters is involved. When masters can be made from materials that will stand up over a considerable period of time, it is no longer practical to work out the required grooves with a hand tool.

Engravers brass is much used, and is superior to ordinary brass for this purpose in that it is not so difficult to work and will not raise burrs like ordinary brass. Designs are best cut into this material with a vertical milling machine, or with the engraving machine spindle itself while it is locked in a routing position. Any circular portions required in the design should be swung in with a circular table, or by means of a graduated circle master. as already mentioned. Steel copy can also be prepared for use as masters in similar fashion. Steel is especially good material for masters that are to be traced with the stylus thousands of times, the steel being hardened to resist wear.

Three-Dimensional Models

Where three-dimensional work is to be handled, using a modeling bar as mentioned in the preceding article, it is necessary to make up a model for use as a master on the engraving machine. Here, again, the severity of use the model must undergo is the factor that determines the method that will be used for making it. Sculptors' models of wax or clay can be transformed into brass models, and this process is often used. The model can further be tooled with fine detail, if desired, after the brass model has been obtained.

Using the sculptors' wax or clay model, a plaster or stone mold is poured around it. The plaster powder and liquid are mixed together, and poured around the original that is to be reproduced. In from 12 to 30 hours, the mold will have set, will have very

great strength, and will have a very smooth and hard surface, resembling marble in hardness. Using this "stone" mold, a hard alloy brass casting can be poured. The stone mold holds accurately to size and detail from the original, so the brass casting thus obtained will be a very accurate reproduction of the original artists model.

The brass must be properly alloyed in order to be sufficiently hard, but when the work is properly done, extremely fine detail can be obtained in such a model and reproduced with the engraving machine. The fine detail of a floral design in a silver spoon die, or a die having detail simulating feathers on an eagle's head, are possibilities which may be cited.

Cast iron and cast bronze models are used for many types of work with very good success. It is reported that a special photographic process has been developed which allows the making of models by an enlarging process. Many times models that are made from some soft base material, such as ordinary brass, lead bronze, or zinc, can be made highly durable by spraying them with a harder metal, giving them a coating from 0.004 to 0.010 inch thick, Electroplated coatings of harder materials is another possibility.

Where long service is not contemplated, a model may be made of various other materials. Bakelite and other plastics are sometimes used for the purpose, and in some instances hardwood models are employed. Where hardwood models are used, they should be carved on the end grain, as it withstands wear to a far higher degree than side or edge grain. Seasoned, close-grained stock, such as birch or hard maple, should be employed rather than any material with open grain.

The stone mixture which has been mentioned for use in making stone molds can also be poured into molds to make castings which can be used

COMPLETE TEXT ON AIR GAGING

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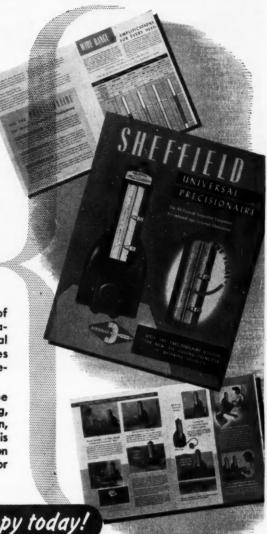
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directly as models, where comparatively simple shapes are involved, having no sharp corners or detail to chip. A material known as Cerrobase has also been used for models which do not have to stand up under severe wear or for any great length of time. Like some of the other materials which have been mentioned, however, it can be made highly durable by applying a hard spray gun coating, or by electroplating with hard chromium.

(The third section of this article will be published in the July number of MODERN MACHINE SHOP.)

Consideration for Visitors

The visitor making his first call at the plant of the Foxboro Company, Foxboro, Mass., manufacturers of industrial instruments for accurate measurement and precise control, undoubted'v experiences a warm feeling of appreciation upon receiving, from the receptionist, a small folder which answers a number of important questions that may be lurking in the back of his mind. The folder is printed on the two sides of an 81/2 by 11 sheet, folded to 41/4 by 51/2 inch size and bears on the front the legend "Welcome to the Foxboro Company, Foxboro, Massachusetts."

Upon opening the folder at the first fold, he finds, on the left-hand page, this

statement:

"It is our intention to extend every possible courtesy to our business callers,

and to save your time.

"The receptionist will announce you, as soon as you have introduced yourself. If you have not been received within five minutes thereafter (or an explanation given for the delay) she will announce you again.

"Please make yourself at home while you wait. The receptionist will be glad to furnish information, memo pads, and

such facilities.

"If you wish to wash up, there are suitable rest rooms for men and ladies in the Company Garage, across the street. (Military regulations require that visitors be tagged and escorted when in the Office Building or Factory.)

"Although the Company Garage does not seek to compete with the garages and filling stations of the town, its facilities are available to you, if you wish.

The Cafeteria serves lunch from 11:30 to 1:30. You are welcome to make use of it."

On the right-hand page is a statement regarding the company's products, locations of its branch factories and offices, and a list of the different kinds of instruments and recorders made by this company. On the fourth page is a list of the names of the executives and department heads, with their titles, under these headings: Purchasing, Production, Sales, Advertising, Accounting, Training Courses, and Officers of The Foxboro Company.

Upon opening the folder to full size, the visitor finds in the upper righthand corner of the sheet, a simple map showing the highways that pass through Foxboro in both directions ending at Boston to the northeast. Providence to the south, and Worcester to the northwest, with all of the intervening towns and villages. In the upper left-hand corner, at the left of the map, are instructions for reaching Foxboro by automobile from these various cities, giving the distances and the numbers of the highways. notation is included as to the parking space that is reserved for visitors. Across the center of the sheet is a notation as to the railroad that passes through Foxboro and upon the lower lefthand corner of the sheet is printed a railroad schedule of all the trains that pass through Foxboro, giving the leaving times from Boston on the north and Providence on the south, with the times of arrival at Mansfield. The lower righthand quarter of the sheet bears a short history of the town of Foxboro with information as to the population and the locations of the principal buildings.

The small cost of this "Welcome" is undoubtedly repaid many times by the friendly feeling that is developed in the minds of visitors toward The Foxboro

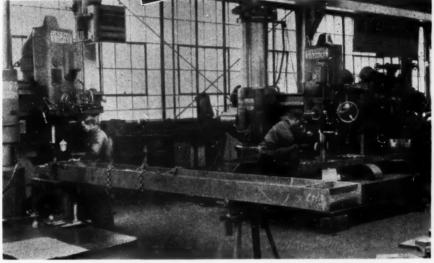
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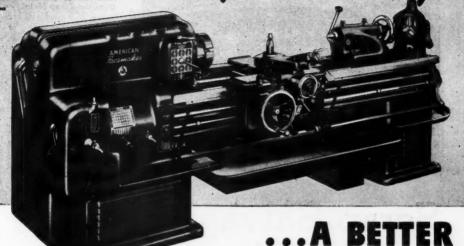


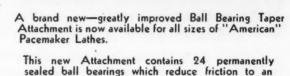
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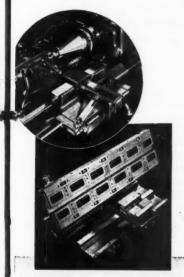
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By

STEPHEN

PORTER

LATHROP

Scrap Salvaging Effects Savings

An outline of the methods employed in the U.S. Naval Ordnance Plant at Chicago in the salvaging of scrap metals, oils, greases, rubber, paper, and so on.

THE economic loss resulting from the unscientific disposal or "throwing away" of industrial scrap runs into tremendous figures. However, industry is fast learning that these losses can not only very materially be lessened by means of a scientific scrap salvaging program, but can be converted into an extra profit. Such a program—scientific scrap salvaging—has been in effect in the U. S. Naval Ordnance Plant at Chicago, Illinois, for some time, and with most satisfactory results.

The U. S. Naval Ordnance Plant was originally the Amertorp Corporation—a subsidiary of the American Can Company—and is located in Forest

Park, which is a suburb of Chicago. The Amertorp Corporation was set up during the war to engage, chiefly, in the making of torpedoes. The Forest Park Plant was set up by the Navy to manufacture for the war effort.

The industrial scrap resulting from the manufacturing operations in this plant consists of solvents, oils, greases and metals, to which should be added paper, rubber, and burlap. In the beginning of its operations these various scraps were disposed of in the usual manner, resulting in either a total loss or a most meager financial return. For instance; scrap oil was being burned under the boilers at a rate of some 2,000 gallons a month because the price



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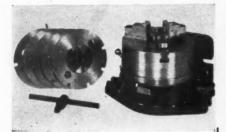
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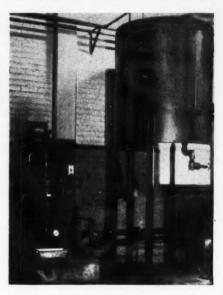
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offered for scrap oil at the plant was less than paid for fuel oil. Without a salvaging program it was profitable to use the scrap oil for fuel, but when a salvaging program was instituted, conditions changed.

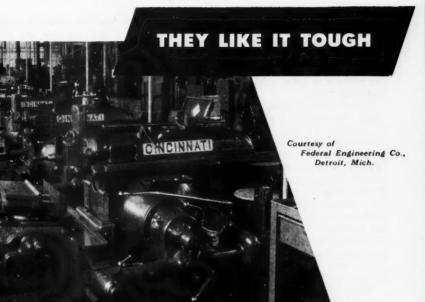
Clifford S. Pester, plant engineer, felt that the waste was unnecessary, so he began a study of the situation in an effort to work out a program of salvaging that would afford some re-



Oil Flows from the Centrifuges to the large Tank Shown Here. The Sharples Centrifuge at the Left Removes all Solids Remaining after the First Centrifuge Treatment

turn from the plant scrap. After the plans had been completed the program was delayed several months by inability to obtain the necessary equipment, but with the arrival of the equipment the new system of handling the industrial scrap was put into effect.

The solvent used in this plant is the Stoddard solvent, used to wash parts in process of manufacture and assembly. To salvage this solvent a Bowser filtration and distillation unit was in-





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stalled and now the used solvent is passed through this unit, the salvaged solvent being drawn off into tanks from which it is later reissued. The residue resulting from the filtration of the solvent is later sold to an oil re-

claiming plant.

Many different cils are used in this plant, the variety including anti-rust oil, cutting oil base, lard oil, torpedo lubrication oil, quenching and blending oil, soluble oil, transformer oil, and cylinder oil, compression oil, gear oil, hydraulic oil, machine oil and spindle oil. The cutting oil, used to cool tools during cutting operations, is collected from the scrap metal produced during the cutting process. The metal scrap containing the oil is loaded into a Barrett centrifugal, where the oil is separated from the scrap metal by centrifugal force.

The cutting oil flows from the centrifugal through a pipe in the floor to a tank in the floor below from which is it pumped to a Sharples Super-Centrifuge which removes any remaining solids and water and returns an oil that is suitable for use in the machine tools again. The scrap metal from which the cutting oil was drawn is set aside and sold as scrap metal without further treatment. Incidentally, it might be well to mention here that all metal cuttings are segregated according to the kind of metal, so that the highest market price can be obtained for the scrap.

Before the reclaimed cutting oil is reissued for plant use, however, each batch is carefully checked by the laboratory staff to make sure that it has the necessary qualities. If the tests show that the quality of the salvaged oil has been impaired, the reclaimed oil is blended with new oil until the quality has been built up to the necessary grade. It is then reissued to the plant.

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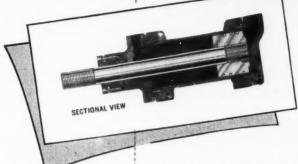
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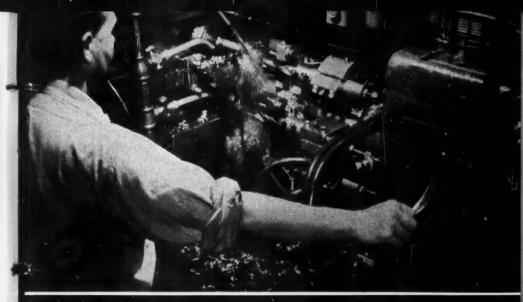


Segregated Scrap Metal Awaiting Disposal

reduce friction between the wall of the tube and the surface of the torpedo when the torpedo is fired from the tube, in the course of which it becomes mixed with water. When this oil is returned to the oil room of the Forest Park plant it is first allowed to stand for twenty-four hours to permit the oil

and water to separate, after which the water is drawn off. The oil is then run through a Sharples super-centrifuge to remove any solids which may have been picked up by the oil, and also the small remaining amount of water. Since this oil must be absolutely free of water before it can be used, it is





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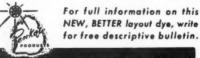
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PENINSULAR CHEMICAL PRODUCTS COMPANY 6795 E. NINE MILE RD. VAN DYKE, MICH. pumped to steam heating tanks where any remaining water is boiled off.

After the boiling-off process has been completed, the oil is run through a Honan-Crane purifier which removes any remaining particles of foreign matter. Each batch then goes to the plant laboratory where it is subjected to exhaustive tests to make certain that the oil is up to the required standard for use. If it passes the tests, it is stored for reissue.

All other lubricating oils are handled in the same manner during the salvaging process, and where a batch of oil, upon test, is found to be lacking in the required properties, it is built up by blending with new oil until the resulting product is comparable to new oil.

The greases used in this plant are of two kinds; pressure grease and ball bearing grease. Because of the limited quantities of greases that are recovered, together with the fact that salvaging of such greases would involve more expense than the cost of salvaging would justify, these greases are not processed with idea of salvaging. They are pooled until the amount is sufficient to sell to an oil refining plant.

By far the greatest variety of scrap materials resulting from industrial operations in this plant are metals, consisting of nickel chrome alloy, nickel chrome, moly alloy, tungsten alloy, nickel steel low expansion, chrome vanadium alloy steel spring wire rivet rod steel, manganese steel, commercial free machining brass, brazing brass, nickel copper tubing, mild carbon steel, aluminum alloys, naval brass, phosphor bronze, manganese bronze, high tensile manganese bronze, silicon bronze and plain carbon steel.

The salvaging of these scrap metals consists solely in collecting them for resale without processing of any kind. However, each kind of metal is carefully segregated and sold in a separate vhere has ough noves reign o the ected rtain tand-, it is hang the batch king ilt up e renew Long Wearing

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lot so as to obtain the maximum price for the scrap. Several scrap collectors work out of the salvage department, each of whom has his own departments from which to collect the scrap. The collected metal scrap is returned to the oil and scrap reclaiming room where it is stored until enough of each different kind of metal has been collected to make a car load or truck load, then it is sold.

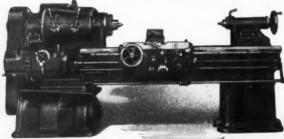
Rubber scrap consists of miscellaneous pieces of hose, sheeting and so on which is collected and held until the quantity is large enough so that it can be sold. The same is done with paper and burlap. Confidential reports and papers are shredded before being baled. Wooden boxes that are in good condition are sold as whole boxes; broken boxes and crates are knocked down, the nails are removed and the pieces are sent to the carpenter shop for use in lieu of new lumber in plant repairs.

The savings effected through this

salvage program are well worth mention. As stated above, the plant was using an average of 2,000 gallons of waste oil a month in its boilers because the price offered for the oil in the unsalvaged condition was less than the price asked for fuel oil. With the installation of reclaiming equipment it became more worth while to salvage the oil and buy fuel oil for the boilers. The reclamation process produces about 1,500 gallons of oil sludge per month which, because there is no means for processing it profitably, is sold to an oil refinery.

The plant uses about 5,500 gallons of torpedo oil per month, some 50 per cent of which is reclaimed and reissued for the same purpose as new oil. Cutting oils are used to the tune of some 4,500 gallons a month, of which 75 per cent is reclaimed. The consumption of hydraulic oil runs around 550 gallons a month, of which amount 75 per cent is reclaimed and reissued. Lubricating

DEPENDABLE PERFORMANCE BEGINS AT THE GEARED HEAD Smooth, Selective Type



Back gears are mounted in front of the spindle. This position of the back gear shaft and gears with its relative motion to the rotation of the spindle causes a downward rotating pressure of the headstock and bed instead of an upward pressure and counteracts the upward lift of the turning tool.

BOYÉ & EMMES Geared Head ENGINE LATHES

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METAL-CUTTING LUBRICATION

Problem and Solution in Tapping Stainless Steel

TAPPED TO A DEPTH OF 3/4", CHIPS WOULD TEAR THREADS AS TAP WAS BACKED OUT

Knowledge of lubrication and your specific machining operation often combine to solve a stubborn and costly metal-cutting problem ...

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"White Rodgers Electric Company has been buying our Chillo 1000 and using it to blend their own cutting oils. Recently, they seemed to be having a difficult time in tapping 430 Stainless Steel.

"When I checked the job, they were using Chillo 1000 with the characteristic

attitude that if 1 gallon of base to 5 gal. of mineral oil is good, then 2 gal. of base

should be twice as good. This was carried to the point where they were using a 50-50 mixture which was very viscous and obviously not cooling the work nor reaching the cutting end of the tap.

Blending Problem Avoided

"The 430 Stainless Steel tore badly when tapped to a depth of 34 inches with a 5/16 inch tap. It was a blind hole and apparently the threads were being torn by the chips when the tap was backed out. Since the blind hole had plenty of chip clearance in the bottom below the threaded section, we changed from a 3 fluted tap to a 2 fluted tap with a 'Gun Groove' ground in the end to throw all the chips forward . . .

with backing out the tap.

"This seemed to help quite a bit. However, the oil was still not reaching the cutting end of the tap.

"We recommended Cities Service Grade A-90 for this job, because we felt that it had the necessary additives and would avoid the blending problems encountered with Chillo 1000.

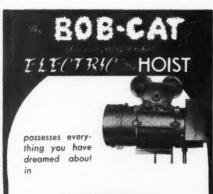
"Grade A-90 has proved so satisfactory that White Rodgers are using it on all stainless steel. In addition, the Engineering Department is specifying Grade A-90 on all prints of stainless steel jobs along with recommended cutting speeds."

Expert Counsel Available

Through continual contact with the lubrication problems encountered by industry over the years, Cities Service Lubrication Engineers have accumulated considerable information on ways and means for reducing costs and improving the performance of lubricants. See for yourself how they can help you. Contact your nearest Cities Service branch office or write to Cities Service Oil Company, 60 Wall Tower, and thus not interfere New York 5, New York.



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All parts instantly accessible by loosening of four bolts only—
Perfect fingertip control—
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Small maintenance.



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oils are consumed to the extent of 1,500 gallons a month. Around 300 gallons of this oil are collected again and of this 300 gallons 90 per cent is reclaimed and reissued for use.

Approximately 14,000 gallons of solvents are used per month, of which 50 per cent is reclaimed. The balance is lost through evaporation and spill.

In the metal department the salvage



Still and Storage Tanks for Reclaiming Solvents from Scrap

represents an even greater saving. Chips and shavings from the machining of ferrous metals amount to 191,000 pounds a week, and in the nonferrous metals department an average of 7,000 pounds a week are salvaged. It is true that these figures were taken from average weekly statistics during war time production, but the probable savings under peace time production schedules will be proportionately worth while.

How SPEED SAVES MONEY

A production record like this is a challenge to any plant that turns out precision parts in large quantities.

Here is a steel Bearing Race, $3\frac{1}{4}$ " x $4\frac{5}{8}$ ", turned from SAE 4620 Tubing. Close concentricity must be held between outside contour and the bored and reamed inside diameter.

An Acme-Gridley 4¾" Four Spindle Bar Automatic does the complete job in less than 1½

minutes machine time:

We suggest you compare that with the time it would take to do this job on equipment you now have. More important, if you want a modern-method time estimate on producing a special job of your own, write us about it.

Modern-method timesaving is certainly one of the answers to your price competition and larger volume of sales.

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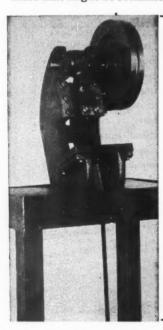
Scrap salvage, however, is not the only phase of the salvage program that is worth mention. In the production department a salvage program has been in operation which is equally as interesting and as valuable. In the manufacture of the various parts that enter into the construction of the torpedoes produced at this plant there are, naturally, rejects which for one reason or another cannot be used. As a matter of fact, the inspection on torpedoes is much tighter than would be the case in the average manufacturing plant.

Under the direction of Ed Kuty, salvage foreman, a scientific salvage program has been in effect for some time. The various parts that are rejected by the inspectors are set aside and at regular intervals Mr. Kuty examines each one of the rejects and the reason for its rejection. Parts that obviously are beyond repair are condemned, and those that might be reclaimed by addi-

tional work are set aside for the consideration of the salvage committee. If the committee decides that reclamation is possible, the part under consideration is sent to the salvage department, where the defect is corrected.

Some of the methods used in the reclamation of salvage parts are interesting. For instance; one of the suspension beam slots in the security flask on a "Mark 13" torpedo had been cut in the wrong place in relation to another slot. Actually, the dimension between the slots was too short. To correct the error a segment was added in one of the slots.

In this plant the parts salvage program has served a two-fold purpose. In the first place, reclamation of parts that were not beyond repair helped to keep needed parts flowing to the assembly department and thus helped to maintain production on a vital war need. Obviously, it took far less time



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to reclaim the partly-completed parts than to make entirely new parts. Second, the savings in costs often amounted to a tremendous percentage, as in the case of the salvage of the air flask for the Mark 13 torpedo.

Altogether, the results that have been obtained in the Forest Park Naval Ordnance Plant through scientific salvaging should provide an indication of the extent to which similar results could be expected in plants devoted to peace time production.

Japan's Industries Costly

Economic disintegration is far less severe in Japan than in Germany. The bulk of Japan's coal mines and hydroelectric power stations appears to be intact. Japan's food supply does not need as much padding as that of Germany. The removal of Japanese war industries will have small economic repercussions. These industries were decidedly parasitic and far too costly.

Hevi Duty Furnace Bulletin HD-1245. A 12-page bulletin illustrative and descriptive of pit type convection furnaces for temperatures of from 250 to 1,850 deg. F. is now being issued by the Hevi Duty Electric Co., Milwaukee 1, Wis. Also pictured and described are pit type furnaces for special applications. Copy of Bulletin HD-1245 free upon request.

"The Moisture Engineer," a bulletin published by the Kathabar Division of Surface Combustion Corp., Toledo 1, Ohio, provides operating data on the Kathabar systems of humidity control units which have been installed for affording comfort and/or industrial processing atmospheres. The center spread of the bulletin has been devoted to the color reproduction of a moisture engineering chart which was developed specifically for the analyzation of humidity problems in comfort air conditioning and in industrial processing atmospheres.

Copy of the bulletin is available free to executives addressing requests on their company letterheads.



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Yes, your industrial distributor does these and many more things in both your and the manufacturer's behalf which it would be uneconomical for either to do independently.

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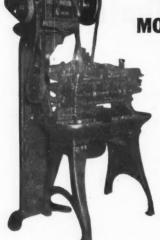
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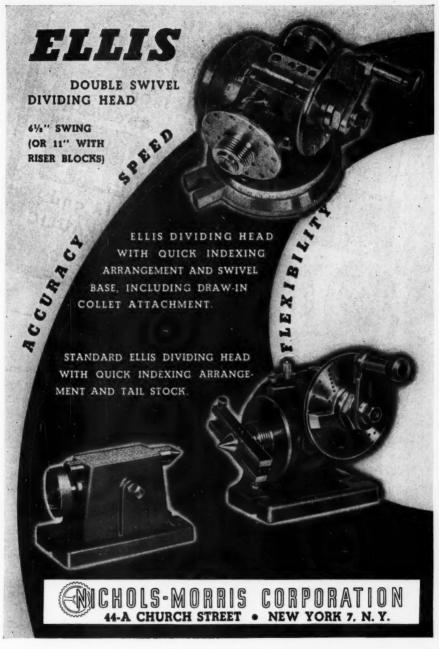
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A Bill of Rights for Labor and Management

By F. W. WILLEY
President, Willey-Wray Electric Company,
Cincinnati, Ohio

IF it were possible to discard the presently prevailing concept of enterprise operation and set it up on an entirely new basis, what fundamental principles should form the foundation? The prime consideration must, of course, be fairness to all. Common sense must be used in determining that fairness. Taking into consideration every factor involved in the relations between labor and management, or between the employer and the employee, five principles that may be considered as fundamental are suggested herewith.

1. That all wages and salaries be set by scientific methods so that they will, in each individual case, comprise a true measure of the contribution of the individual to the enterprise.

2. That invested money be recog-

nized as a necessary tool in the operation of the enterprise, and that a rental or hire be paid for the use of invested moneys and that such rental or hire be considered as an expense to the operation of the enterprise.

3. That workers be privileged to become co-investors in the enterprise, their investments to have the same status as other invested moneys.

4. That when profits are realized after payment for human hire (wages and salaries) and for investment hire (interest), such profits shall be divided through a uniform dividend on every dollar earned and every dollar invested. Should loss occur, it shall be shared in like manner.

5. That the relation of worker to worker and worker to management be put on a team-work basis of sound

> and sensible mutual understanding and confidence,

As a matter of fact, no one of these principles is new, either in theory or practice, although rarely have all five been applied in any one enterprise. However, a careful study of these five principles will reveal that they hold the solution to most of the cur-

The principles outlined in this article have been in effect in the Willey-Wray Electric Company, Cincinnati, Ohio, throughout the past twenty-six years. Although a small company, this firm has had no labor difficulties during that period.





The compact design of the 1/4" MallDrill makes it easy to handle in close quarters and cramped positions . . . its perfect balance permits operation with either hand . . . and its light weight reduces the worker's fatigue when drilling in difficult positions.

It is equally efficient on metal, wood and plastics. Its powerful, high speed motor, special steel alloy gears and extra long brushes combine to assure long, constant service. Commutator and brushes easily serviced without dismantling. 1/4" MallDrill is available in two speeds—1700

r.p.m. or 2500 r.p.m.—and in two models—for 110-volt AC-DC or 220-volt AC-DC. 1/2" MallDrill is tailor-made for heavy duty drilling. It has 1/2" capacity in metal and 1" capacity in wood. Its powerful, ball-bearing motor has a free speed of 500 r.p.m. Available for 110-volt AC-DC or 220-volt AC-DC.

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The Blacker Hammer combines an electric-motor-driven power hammer with a blacksmith's anvil in one unit. Enables one smith alone to do work of smith and two helpers. Leaves both hands free to manipulate work. Requires fewer heats per job. Delivers faster, heavier blows than possible by hand. Investigate.



ent labor-management problems. They contain the all-important element of flexibility — give and take — which must be included in any labor-management program, with every step based on common sense.

1. Setting of Compensation

Rates of pay for services rendered comprise a constant potential source of irritation. Each individual has a full right to compensation according to the value of his contribution to the enterprise. That value is dependent upon the nature of the job allotted to him and the manner in which he fills it. Both factors are important,

The nature of the job may readily be evaluated by a system of job classifications which serve as a basis for job base rates. The manner in which the job is filled may also be evaluated, through the application of a system of merit rating. The combination of these two factors will provide a sound basis for setting rates of compensation. The processes may be applied to every employee of the company, from the chief executive on down.

2. Hire (or interest) for Investment

Enterprise can neither be originated nor operated without the use of invested money. There have been estimates that housing, equipment and inventories require as high as \$10,000 invested capital per worker. money thus invested is entitled to a reasonable compensation for its use, entirely separate from its risk. When temporary need for additional capital arises, it is borrowed from banks who charge a hire for the use of it. It is logical that investors who lend their money for building and operating the business receive hire for their money similarly.

The principle thus advocated is not generally recognized, but this fact does not necessarily condemn it. The charg-

DESTRUCTIVE TOOL BIT TEST HARDSTEEL US. Cast Alloy Cutting Tools

TEST LOG

Material: Hardened and drawn High Manganese, High Carbon tool steel.

Tensile Strength: 176,000 lbs. per square inch Rockwell Hardness: C-38 Average

Depth of Cut: .100" Feed Per Revolution: 0035" Surface Feet Per Minute: 130

RESULTS

Average Total Time to Failure Tool End Wear

burnt

"Hardsteel" 20 minutes Competitor "A" None

11 minutes Competitor "B" .008"

10 minutes Competitor "C" .007"

8 minutes cutting edge

Conclusion:

The inherent heat resistance of The innerent neat resistance or "HARDSTEEL" tool bits makes it possible to hold size longer between grinds, and take faster, deeper cuts.

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arg-1946 ing of such investor-interest as an expense to the enterprise is not currently accepted, even though interest on temporary capital borrowed from banks has such standing. Both kinds of dollars serve the enterprise, but they are treated differently under present practice. This system is not logical.

The interest rate charged by the bank for the use of its money is a fair yardstick of the rate to be paid on invested capital. It is true that the bank takes little risk in its loans; thus seemingly the investor's rate should be higher. The bank, however has no chance to receive more than the agreed rate of interest, or hire, whereas under the fourth principle listed above the investor has a chance for additional return in the form of profit. Care must be exercised to distinguish the use value of investment from its risk features.



Every person should lay aside a portion of his earnings throughout the years of his highest efficiency either to provide a foundation upon which to build at some future time or to provide security against the day when his efficiency begins to wane. Such savings should either be used to purchase permanent investments, such as a home, or be safely invested for additional earnings. The investment of savings is a great problem to the average person: taking "flyers" is risky, and profoundly safe investments yield but small return. Many people purchase stocks of which they have little knowledge and over which they have no control.

If a worker can safely invest in the enterprise for which he is working and from which he draws his wage or salary, and if the management will keep him fully informed concerning the financial matters of the company,







"dead true" at the Collet mouth and within .002" two inches from the Collet mouth. Rivett Draw-In Collets are available in all standard styles for bench lathe, engine lathe, miller and grinder use.

They have personality derived from a worthy inheritance and a steadily improved environment. When shipped, each Rivett Collet reflects more than fifty years of Collet manufacturing "know-how" and the most advanced machining and inspection.

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* For complete information on all Rivett Collets and their adaptation to existing machines write for Bulletin 190C.



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F. F. GILMORE & CO.

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he has a real reason for saving a part of his earnings His own job effort will improve. He has the feeling of being a part of the enterprise team. However, to make such an arrangement equitable, management must agree that co-investor dollars are to be treated just like capital-investor dollars.

There is no need to sell stock to the co-investor; investment can be arranged on a note basis with terms according to the requirements of the particular enterprise. Reasonable redemption features should be considered. Unlike stock issues, the note plan leaves to management the full power and responsibility to manage. The co-investor should receive the standard rate of hire for the use of his money, plus the rights and responsibilities outlined under "Sharing Profits and Losses."

4. Profit and Loss Sharing

Adoption of the principles outlined above will have the result of making a team of human effort and investment, and a team of labor and management. Should profit result, all contributing effort should be rewarded equitably. Labor's contribution in human effort is measured by the payroll, in dollars. Contribution through investment is measured in dollars. Each dollar earned and each dollar invested should be rewarded by uniform dividends. The entire profit need not be paid out in boom years, however; it is good business to hold a portion in a dividend reserve in order to maintain dividend payments in years when loss is unavoidable. Quarterly distributions have advantages over lump sum payments, in that they tend to stabilize spending habits.

It is a poor rule that doesn't work both ways. Enterprise is set up and conducted for the purpose of serving mankind by furnishing needed goods or services. A fair remuneration for part will eing lownent gree be stor the arrms the re-

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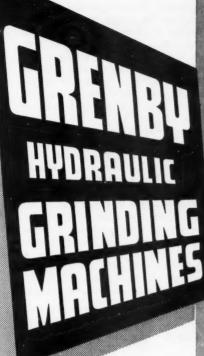
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this service is returned in the form of profit. The enterprise can live if it breaks even, but it cannot survive continued loss. When loss is unavoidable, it must be compensated by a reduction of the cost of hire of human effort (the payroll) and of the interest on the investments. Each must sacrifice on the same percentage basis. Quarterly statements should determine the status of profit and loss.

This plan would eliminate the necessity of appreciable layoffs during slack periods, thus preventing mass unemployment. Each, from the president on down, would receive less, but all would have jobs. This is a sensible plan for truly equitable job security.

5. Human Relations in Enterprise

In order for any group of persons to function efficiently, authority must be vested in some person or persons. In enterprise that authority is called management. It provides the leadership, makes the plans for operation, and judges the results. The workers put the plans into effect. The two groups work together as a team, and spend about half their waking hours together. No other phase of living absorbs as much time; therefore it is important that working hours be as pleasant as possible.

Neither socialistic nor paternalistic systems or methods produce the proper relationship between worker and management. Both are human, and should receive sensible treatment from one another. If chaos is to be avoided and the best possible results are to be achieved, authority must be respected, but there is no need for halos or brass hats for management. Respect without good will is hollow indeed. A house divided will fall. An enterprise divided will fail in its human relations. Cooperation is improbable—if indeed





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not impossible — without a common bond of friendship generated on a natural and sensible basis.

Conclusion

It is not to be expected that the five principles outlined above can be applied by all enterprise overnight. The current friction between labor and management is the result of many years of apathy on the part of management toward the whole matter of labor relations, and much of industry will arrive at a solution only by the slow, tortuous trial-and-error method.

However, considering that the principles here presented have formed the basis for a labor-management program that has been in successful operation in one plant for nearly 26 years, they might be worth serious consideration. Small enterprise might adopt such a plan without too much difficulty, and it would be just as adaptable to large enterprise. But any

such move must originate in management, and must be thoroughly understood by each and every worker if success is to be achieved.

Microcast Process, a unique process of precision casting, is the subjejct of an eight-page booklet published by Austenal Laboratories, Inc. The booklet comprehensively explains the industrial design advantages toward obtaining a high quality product made possible through Microcast. The history and early applications of Microcast are also briefly traced. In addition, specifications and the physical and chemical properties of Vitallium Microcastings are provided as an example of one type of high melting point alloy used with this process.

The booklet contains illustrations showing many castings of intricate shape and design which have been produced of high melting point non-machineable alloys by Microcast. A pictorial step-by-step description of the process is also provided. Copy of the booklet is available free by writing to Austenal Laboratories, Inc., 5932 S. Wentworth Ave., Chicago 21, Ill., or 224 E. 39th St., New York 16, N. Y.

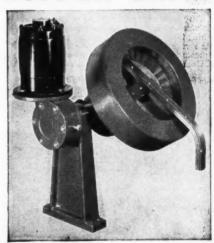
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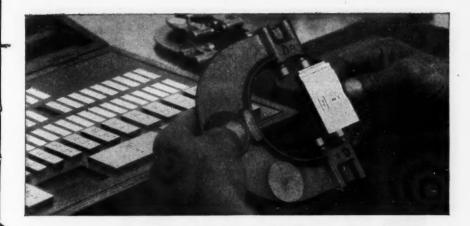
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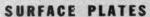
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A large stretch die made from Plastiform. In a recent experimental setup one of these dies withstood a load of 1,350,000 pounds on a conventional stretch press.

Plastiform -Reclaimable Tool Plastic

By THOMAS A. DICKINSON, M.E., Author of "The Aeronautical Dictionary"

ONE of the lastest contributions to the science of tooling without metals is Plastiform, a high-strength plastic which has the unique advantage of being 100 per cent salvageable.

Plastiform is a combined ceramic and thermoplastic material developed by L. C. Wilson, the veteran plastics engineer who gained nationwide recognition for his work with Toolite at Consolidated Vultee Aircraft Corporation. Wilson has made his new plastic available for commercial use through Duorite Plastic Industries at Culver City, California.

West Coast aircraft manufacturers are currently using Plastiform for the fabrication of profile or Keller duplicating blocks, blueing blocks, master mock-ups, master checking fixtures, stretch press form blocks, forms for contact laminating, protective coverings, and molds for casting other materials. The new plastic has been found

particularly suitable for this work because it has a compressive strength of 15,000 p.s.i., high impact resistance, excellent machineability, light weight, and complete resistance to corrosive chemicals such as acids and alkalies.

Besides its reclaimability, probably the foremost advantage of Plastiform is the fact that it can be cast by pouring, brushing, spraying, or dipping without shrinkage or warpage. Individual casts can be thus produced in only four minutes.

Plastiform can be cast quickly and handled safely because it has a melting temperature of only 240 deg. F. Molds and a rectangular or round double boiler are the only special equipment required.

The boiler should be made of either steel or black iron, and a space of 1½ to 2 inches should be allowed between the inner and outer containers. A removable or hinged lid should cover the outer portion of the boiler, and the

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Typical Plastiform form block. Tools of this type will withstand compressive loads of 15,000 p. s. i.

inner portion should be equipped with a lip which will snugly fit over the rim of the outer container. A 1½-inch pipe will satisfactorily vent the outer container two inches from its top. A faucet should be used in withdrawing the molten plastic.

Either gas or electricity can supply the necessary heat, and a thermostat control should be placed in the oil bath to maintain temperatures of 300 to 450 deg. F. The mineral oil used for the bath should have a fire point of at least 520 deg. F., and S.S.U. viscosity of 93 at 210 deg. F., and an N.P.A. color rating of not more than 6.

The inner tank of the boiler is filled with Plastiform; and, for normal melting, the thermostat of the outer tank should be set for an oil temperature of 300 deg. F. If rapid melting is desired,

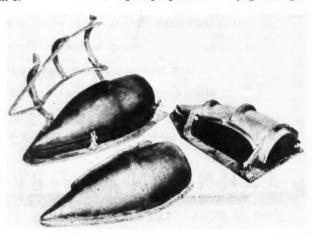
Plastiform was used in casting the base of this drill, trim, and scribe fixture. Besides being reclaimable, Plastiform can be cast by pouring, brushing, spraying or dipping without shrinkage or warpage.

the oil temperature may be increased to approximately 450 deg. F. and the Plastiform should be agitated so as to prevent tackiness, bubbles, and separations. The lower temperature is generally preferable because the plastic flows best at temperatures of 245 deg. to 260 deg. F. In any event, the oil bath should be maintained at a temperature of approximately 50 to 100 deg. F. higher than the desired temperature of the plastic.

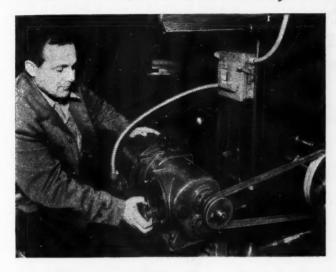
No additives are necessary when remelting or reclaiming Plastiform, and scraps of previously-used batches can be placed in the double boiler along with fresh batches without harmful consequences.

If the plastic becomes congealed on handling equipment, it can be readily knocked off with a hammer. Thick sections are easier to remove than thin sections.

Molds for casting Plastiform have been made from metals, phenolics, acrylates, acetates, magnesite, glass, plaster, cardboard, and wood. If the mold is made of a porous material such as cardboard or wood—it should be sealed with two or three wet coats of raw linseed oil and turpentine mixed to equal proportions. Any good high-



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gloss wax paste can be used as a parting agent in the mold.

When extreme contours or off-sets are to be cast with Plastiform, it is advisable to pre-heat the mold to approximately 120 deg. F. This increases the solidifying time of the material and prevents flow lines. If the mold is of a non-porous material, it is necessarv only to wax the casting surfaces.

Best results can often be obtained by brushing or spraying Plastiform



The base of this saw and trim fixture is made of Plastiform. The clamping device is of metal.

Plastiform is especially useful when metal inserts are required parts of plastic tools, because it will not cause corrosion.

into a mold when no thermal contraction is permissible. An ordinary paint brush may be used, and the mold surfaces can be coated as rapidly as desired. Successive coats build up the desired wall thickness. Each coat should be given at least four minutes to set before an additional coat is applied.

When it is to be cast in the ordinary manner, Plastiform should be poured steadily without splashing until the YESTERDAY'S PIONEER - . . TODAY'S LEADER



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ene at mold is completely filled. Slow or intermittent pouring might cause flow lines, while excessively fast pouring might cause air bubbles to be trapped within the casting.

A hollow casting can be made without the use of a core by filling a mold with Plastiform and allowing it to stand until the desired wall thickness has been attained. Excess material in the center of the casting can then be poured off before it solidifies.

A shell casting can be made by partly filling a mold with Plastiform and tilting so that the material will flow over the appropriate surfaces. Additional pouring and titling will subsequently build up the desired wall

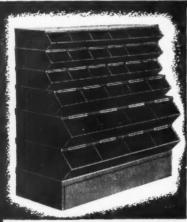
thickness.

Plastiform can also be used to make castings or form protective coverings by dipping. When this is to be accomplished, the mold or object to be protected is first warmed and then immersed quickly in the molten plastic. Successive dips build up the required wall thickness.

The most important thing to remember in casting Plastiform is that the new material will pick up each and every minute detail on the surfaces of a mold. For this reason, the surfaces of the mold should be as smooth as the surfaces desired on the finished prod-

Excessively rough handling can cause Plastiform castings to become marred or cracked. Slight defects can be readily patched by filling in with new material, which can be heated and worked by means of an ordinary soldering iron. Large recesses can be filled in with a paint brush, or by pouring the molten material into the given areas, since a bond will be formed immediately.

Because there is no appreciable shrinkage in Plastiform. suitable drafts should be made on all molds so that castings of the new material can



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The upper details in this photograph show how the two parts of a plaster mold are adjoined for casting Plastiform. The lower details show the Plastiform block that was cast in the mold and the appearance of the Dural parts formed by the mold in connection with a hydropress.

as much care as ordinary plastic tools

When metal inserts, such as drill bushings, are required parts of tools, Plastiform is particularly useful because it will not cause corrosion.

To date, the most extensive application of Plastiform has been in the manufacture of stretch dies. In a recent experimental set-up, one of these dies withstood a load of 1,250,000 lbs. on a conventional stretch press. When the load was increased, the fi-inch Dural sheet that was being stretched failed completely and the Plastiform die bounced several feet into the air. Then an examination was made and the die was found to be undamaged.

The normal color of Plastiform is

be easily removed. The finished casting can be sawed, sanded, drilled, or machined like moderately hard wood. Polishing can be accomplished simply by rubbing the plastic surfaces with steel wool.

Several thermosetting plastics have more compressive strength than Plastiform; but none of them can be reclaimed, and few have the new material's impact resistance of ½ foot lbs. (Izod). This means that Plastiform tools do not have to be handled with

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New Catalog RT-46

This is not a catalog primarily intended for purchasing departments as it gives only technical information, but it does show by description and illustration our very complete line of hardness testing equipment, including the "TUKON" Tester and the new "ROCKWELL" Universal Testing Unit.



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Several pages are devoted to making clear the difference be-

tween, and the difference in intended applications of, the normal type of "ROCKWELL" Tester and the "Superficial" machine. You hear more and more about the "Superficial" each year.

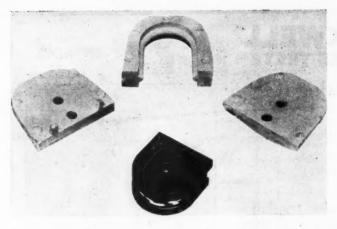
This catalog is of 40 pages with over 50 illustrations. It is only 71/2'' x 6" and printed by offset process on light paper. Do not hesitate to ask for it because you may not need more testing equipment. We would like everyone at all interested in the subject of hardness testing to have a copy.



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MECHANICAL INSTRUMENT CO., INC.

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The upper three details in this photograph are parts of a plaster mold. The lower detail is the bending block made with the mold. Bending blocks of this type are used by aircraft manufacturers to form Dural tubing

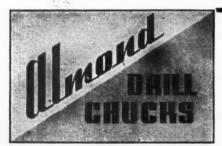
ing the surface of the non - plastic and applying the new material as previously explained without the necessity of

using a parting agent.

Probably the most unusual use for Plastiform has been developed by Douglas Aircraft Company at El Segundo, California, where plaster airplane mock-ups or models are being coated with the new plastic so as to

gray-green. However, the material can easily be dyed for many other colors.

If necessary, Plastiform can be strongly adhered to wood, plaster, concrete, and other non-plastic materials. This is accomplished simply by clean-



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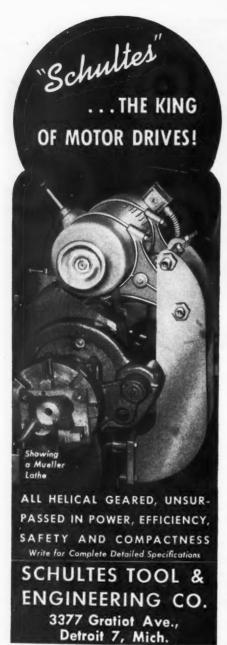


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prevent deterioriation due to climatic and other conditions. This saves the company thousands of dollars by making it unnecessary to rent or build the warehouses in which airplane mockups are ordinarily stored.

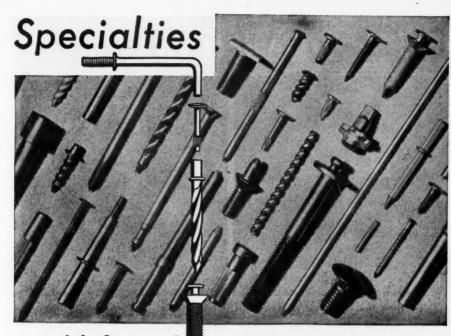
Oil with a viscosity rating of 10 is used as a parting agent in connection with the mock-ups at Douglas. The Plastiform is applied to the oil-coated model with a paint brush; and, whenever necessary, the plastic coverings can be removed by lifting. Moreover, it has been found that the plastic coverings can be used as molds for casting duplicate mock-ups.

Because it is 100 per cent resistant to acids and alkalies, and repellant to water and oils, Plastiform should be particularly useful in the future as a material for making electroplating vats and various items of laboratory or machine tool equipment.

Physical Properties of Plastiform

Compressive st	rengtn15,00	10 p.s.1.
Weight	90 lbs	./cu.ft.
	ce (Izod) 1/3	
Melting point		240° F.
Resistance to A	cids and	
Alkalies		100%
Resistance to W	ater and	,
Oils		100%
Shrinkage on ar	plication	None
	Ex	
Color (Normal)	Gray	-green
Fumes when hea	ated No	n-toxic
Time required to	o cool 4 m	inutes
Warpage		None
	teristics	
Reclaimability.		None
Finish	Smooth,	glossy

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2 New ALCO Tools





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inserts, serves as a revolving support for long pieces or where very accurate forming operations call for absolute rigidity. Supports are made to fit the contour of the work and are easily and quickly inserted in the holder. This tool can be changed from a revolving support to a revolving stop and vice versa in just a few minutes.

The Alco Spring Screw Threading Die Holder opens new fields where the very accurate spring die can be used. To those operators who know the accuracy of work delivered by the spring die versus the acorn or button die, this new holder for the spring die will eliminate all the "bugs" which previously had to be overcome. In the spring die, the cutting edges are exactly parallel with the shank diameter so that regardless of the depth of cut, each tooth does the same amount of work. The Alco Spring Screw Threading Die Holder, with its flanges for controlling concentric alignment, keeps the die exactly centered on the work so that not only are perfect threads cut but dies last longer because of even wear.

To those operators who have avoided using spring dies because of the seemingly insurmountable mechanical difficulties encountered in trying to hold the die in alignment with the work, we predict a real thrill in the excellence of work produced when these dies are held in this new tool.

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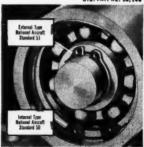
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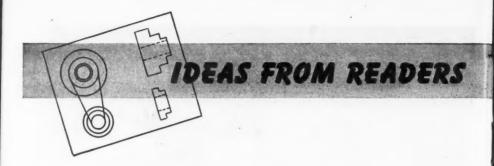
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Combination Cathead and Steadyrest

By BARTLETT WEST

M OST all-round machinists who have had a wide range of experience are familiar with the so-called "cathead." To those whose experience is more limited; the cathead is a short sleeve through the wall of which four or eight setscrews project at 90-degree angles from each other and in the same plane, so that the sleeve can be

Drawing Illustrating Method of Combining Cathead with Standard Steadyrest

positioned on a rough or out-of-round shaft or pipe section and thus present a smooth, cylindrical surface that will run smoothly in a steadyrest.

The drawing shows the design of a combination steadyrest and cathead in use in a southwestern railroad shop. Actually, the one in use was made by mounting a locomotive eccentric strap (used in connection with a Stephenson link motion) on a suitable base and making a steel sleeve to revolve within it as shown, but the drawing is made to represent a standard design of steadyrest found in all shops.

With the top of the steadyrest clamped tightly, the opening in the steadyrest should be bored smooth enough to serve as a bearing. Then a square recess is cut to serve as a retainer for the sleeve, The sleeve, of a good grade of steel, is turned to a running fit in the steadyrest and bored to leave a wall thick enough to provide ample support for the four setscrews. A collar is turned on the sleeve to fit the recess in the steadyrest.

Properly designed and fitted, the combination cathead and steadyrest will prove to be an excellent piece of equipment. The one now in use is used to support odd-shaped work that requires a lathe operation, long work that projects far beyond the ways of the lathe, and so on. An example is the main steam pipe of a locomotive, which extends from the dome to the front



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MODERN MACHINE SHOP

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flue sheet. This pipe is often bent and covered with heavy boiler scale, making it impossible to support it in a standard steadyrest. One end of the pipe has a flange on the back of which is a ground joint that seats in a ring on the flue sheet. To face this joint, the flanged end is chucked and the pipe is supported by the combination cathead-steadyrest.

Greasing Device for Power Conveyor

By R. A. SHAW

THE photograph shows an automatic greasing device that was designed by the author for use on a power conveyor at the Detroit Diesel Engine Division of General Motors Corporation. The conveyor carries cylin-

der blocks through a "Centri-Spray" washer in which the dirt and grease is removed from the blocks by spraying with a cleaning solution. An antirust spray is also applied before the blocks leave the washer.

The conveyor consists primarily of a pair of steel rails paralleling each other and located just far enough apart so that cross bars, connected to a "link belt" that is motor-driven, will support the engine blocks. The cross bars slide on the steel rails as they carry the blocks through the washing machine and on a similar pair of rails as they make the loop to the starting point underneath the machine.

Previous to the addition of the greasing device, it was necessary for a workman to apply grease at regular intervals to the under sides of the cross bars so that they would slide easily on the rails and thus prevent scoring of the blocks. It was also important as a measure to reduce the load on the

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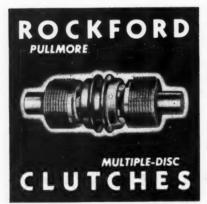
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motor. The engine blocks weigh a couple of hundred pounds each and the conveyor usually carries a load of 12 to 18 blocks at a time; thus proper lubrication is important.

Device for Applying Grease to Contacting Surfaces of Cross Bars on Power Conveyor for Automatic Washing Machine

To eliminate the human factor and ensure continuous lubrication of the cross bars, the automatic greaser was devised. The mechanism consists primarily of two rollers, one a little larger than the other, each carrying a pair of wide wheels which are set the same distance apart as the sliding surfaces on the cross bars. The wheels on one roller are much smaller than those on the other, and a con-

tainer of grease is positioned under the smaller wheels so that, as they revolve, they pick up the grease. As the small wheels continue to revolve against the surfaces of the larger

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 wheels, the grease is picked up by the larger wheels and carried around to be smeared on the contacting under-surfaces of the cross bars. Small crossgrooves in the surfaces of the wheels ensure that the wheels will carry sufficient grease.

To impart movement to the rollers, a gear cut from steel plate is anchored inside one of the larger wheels in line with the link-belt so that the gearteeth will mesh with the links in the belt; thus the movement of the belt imparts movement to the larger wheels, which in turn revolve the smaller ones. The large roller is located at the correct height so that the faces of the wheels will bear on the surfaces of the cross bars.

Fixtures for Drilling Turbine Nozzle Blocks

By E. A. ISBERG

Westinghouse Electric Corporation

BEFORE the inception of the emergency program, nozzle blocks for turbine engines were drilled in a uni-

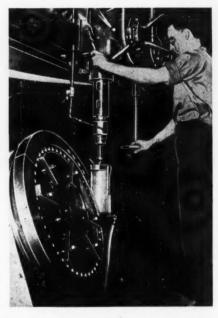


Fig. 1—Drilling the "Nozzle" Side of a Nozzle
Block for a Turbine Engine at Westinghouse
Electric Corporation

versal indexing fixture on a horizontal boring machine. This method

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20" long x 12" wide x 6½" deep. 16 ga., drag holes and handles both ends.

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Fig. 2—Drilling the Rear Side of the Nozzle Block

was used because the quantities of various-size blocks produced at one time were small.

Later, when the quantities were increased, although confined to two sizes, the drilling fixtures shown in Figures 1 and 2 were designed and built so that the blocks could be drilled in a radial drill press. Two fixtures are necessary for the com-

plete drilling operation, because the holes are drilled from both sides and at different angles.

An interesting feature of the nozzle block is the close angle at which the holes in the nozzle side of the block are drilled. Drilling at this angle necessitates the use of an exceptionally sturdy jig and a heavy bushing, as well as a sharp drill.

The use of the new jigs has resulted in a considerable saving in time and cost, due to the greater flexibility of the radial drill, the ease in set-up where the fixture is used for one size of rings only, and the use of quick-

change chuck equipment.

Designing for Welded Construction

By PHIL GLANZER

IN designing a metal product in which the use of welding is contemplated as a medium of fabrication, considera-

Pictured: a 24-Spindle Heavy-Duty Drill Head.

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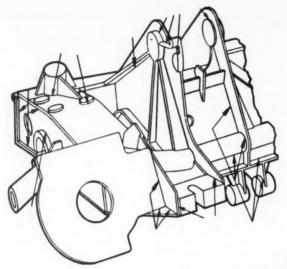
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AIR CLAMPS

PNEUMATIC WORK FEEDERS



tion should be given to new procedures and labor-saving methods. It is often helpful to determine what other deDesign Drawing Illustrating Points at which Welding can be Used in Fabrication of Product

signers have accomplished with welded design, even though the others' work may have been done on an entirely different line of equipment. Following are a few suggestions that may be helpful, although the designer will have to fill in the details of specifications to meet the requirements of the job.

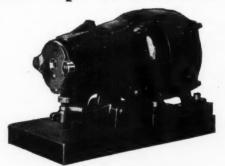
Good structural design involves considerably more than the provision of adequate material to withstand known or calculated

stresses. Among the factors which must be considered are:

1. Number of identical units that

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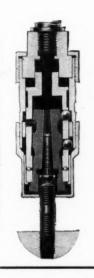
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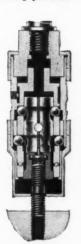
Tool prior to load-

Tool with jaws lock-ed in full register on the stud by up-per balls, but without lower driving balls in positive driving position.

Tool in positive driving position with driving balls pulling jaws up into taper nose bushing. Stud is partially driven to depth.

Stud is driven to proper depth and drive balls are again in free posi-tion, but with jaws still locked in full register as in figure 2. The jaws open up when the tool is lifted off to drive









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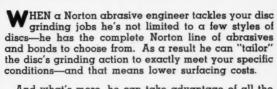


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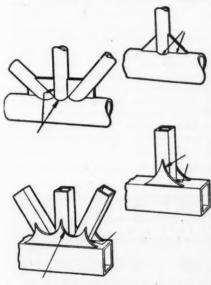
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 - 8. Appearance.

The fact that a designer usually has several possible solutions to a design



Drawing Illustrating Use of Tube Joints in Truss Construction. Tubes can be Used in Designing a Variety of Products and for Many Uses

problem involving the use of welded construction enables him to meet situations which otherwise would be difficult. Structural shapes, plate, slabs and pipe, as well as tubing, have been used in welded construction in the fabrication of structures for widely different functions. The use of welding to incorporate these readily-available forms of steel with forgings, castings, and press-formed components makes possible the use of designs which other-



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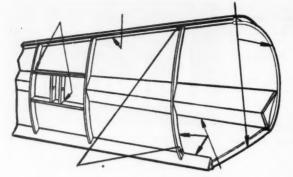
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Part of a Design for a Snow Plow, Showing how Welding is Used in Attaching Reinforcing to Back of Plow. Same Idea can be Used in other Designs

wise would be difficult to fabricate, if not impossible.

The use of welding as a fabrication tool has had an important influence on manufacturing and processing industries, as well as on transportation, agriculture and mining.

Welding played an important part in the development and manufacture of various types of war materials, and wherever possible such equipment was especially designed with a view to fabrication by welding. In most cases but slight changes in design were necessary to provide for the use of welding as a

medium of fabrication, the resulting economy being sufficient to offset the expense of the change. Even where a part must be completely redesigned to permit the use of welding, if the quantity is large such redesign will be found economical.

The drawings illustrate a few of the ways in which welding can be applied to simplify the task of assembling, to



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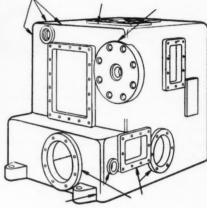
Owasso, Mich. Detroit Rochester, Pa

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reduce the cost of fabrication, and to avoid tying up important machine equipment that is needed for other work. It is a good idea, when a metal product is to be designed or redesigned. to route the design through the de-



Arrows Indicate where Welding has been Used in Hydraulic Pump Construction

signing department with a request for suggestions. It may also be posted on the department bulletin board.

Metco Type Y Metallizing Gun for heavy duty and production metallizing is featured in Vol. 3. No. 7 of "Metco News," quarterly publication of the Met-allizing Engineering Co., Inc., Long Is-land City, New York, N. Y., containing briefs from industry on the latest developments and applications of the metal spraying process. Illustrations show how the many applications of the hand gun in every branch of industry contributed to the development of a metallizing gun for heavy duty and production use only. Various articles appearing in past issues of "Metco News" have been condensed in this particular issue, with reference made to the back issue in which each complete account appeared.
Copy of "Metco News" Vol. 3, No. 7 is

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1946

News of the Industry

S. E. S. A. Spring Meeting

The Society for Experimental Stress Analysis will hold its spring meeting June 24, 25 and 26, 1946, at the Hotel Statler, Buffalo, N. Y. A feature of the meeting will be a symposium on the Fatigue of Manufactured Parts, under the joint sponsorship of the S. E. S. A. and the American Society for Testing Materials.

Bliss Moves Offices

E. W. Bliss Company, manufacturer of stamping presses, rolling mills and can-making machinery, has announced the transfer of its executive offices from Brooklyn, N. Y., to 450 Amsterdam St., Detroit, Michigan. The company will maintain its extensive manufacturing division in Brooklyn as well as its plants in Toledo, Cleveland and Salem, Ohio, Hastings, Michigan, Derby, England, and Paris, France. The move is just one phase of an extensive Bliss expansion program currently under way and which will involve expenditures for buildings and equipment totaling approximately \$2,000,000.

OPA Suspends Ceiling on Most Special Tooling

The OPA has announced the approval of Amendment 13 to SO 129, suspending price ceilings on a long list of industrial equipment, effective at once. On this list are dies, jigs, fixtures, and molds. Ceilings on gages had previously been suspended. However, this suspension does not cover tool charges made in conjunction with the sale of other products, such as, for example, charges for dies supplied by a stamping company for use in making a customer's stampings.

Amendment 13 also suspends ceilings on new and second-hand "heavy" machine tools, both standard and specially designed. On other machine tools OPA has announced that a price increase of 20 per cent over October 1, 1941, prices will be made effective very shortly.

Cosa Corporation Opens Showrooms

The Cosa Corporation, with executive offices in the Chrysler Building, New York City, announces the opening of its showrooms at 4572 Broadway, New York City.

The Cosa Corporation, which represents in the United States many of the outstanding manufacturers in Switzerland of high precision machine tools and measuring instruments, now informs American industry that much of this equipment is on permanent exhibit at the Broadway address.

The exhibit includes Jig Borers, Measuring Instruments, Profile Projectors and Thread Grinders as manufactured by Societe Genevoise d'Instruments de Physique in Geneva, Switzerland, and other well known equipment such as Bechler Screw Automatics, Mikron Gear Hobbing Equipment and Studer Profile Grinding Machines.

\$2,000 in Prizes for Papers on Resistance Welding

At the 1946 Fall Meeting of the Resistance Welder Manufacturers' Association \$2,000 in cash prizes will be awarded to the authors of the five best papers dealing with resistance welding subjects that have been written and submitted to the Society before midnight, July 31, 1946.

The prizes are as follows: one prize of \$750 for the best paper emanating from an industrial source, consulting engineer, private or government laboratory, or the like, the subject matter of which is specifically concerned with resistance welding; one prize of \$500 for the second best paper in the above classification; one prize of \$250 for the third best paper in the above classification.

A prize of \$300 will be awarded for the

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Maintains ± .0005" accuracy

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10 TIMES FASTER than by ordinary methods

Actual tests in cutting keyways 3/16" deep, 3/8" wide, 1-1/2" I.D. and 3" long in a steel bushing proved ten times quicker than in handling the same operation on a shaper. Send for Bulletin 9. Learn more of this and other similar operations.

Send for Bulletin

Patent No. 2,184,383

Dept. B EAST SHORE MACH. PRODUCTS CO. 835 EAST 140th STREET CLEVELAND 10, OHIO, U.S.A.



Glenny Broach in use on an Arbor Press.



Glenny Broach in use on a Turret Lathe in series with other operations.

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paper emanating from a university source (instructor, student or research fellow) which in the opinion of the Board of Awards is the greatest original contribution to the advancement and use of resistance welding. A prize of \$200 will be awarded for the second best paper emanating from a university source.

The contest is open to anyone, without restriction, from the United States, its, possessions and Canada. It is also open to any member of the American Welding Society in any grade from any place in the world. Papers to be entered in the contest should be sent to American Welding Society, 33 West 39th St., New York (18), N. Y. If mailed to arrive not later than July 1, 1946, three copies should be furnished. If mailed to arrive between July 1 and July 31, 1946, six copies should be furnished. Details can be obtained from Resistance Welder Manuf'rs Assn., 505 Arch St., Philadelphia 6, Pa.

Foundry Company Organized

Formation of a new company to be known as the Parkway Foundry & Machine Corporation was announced today by the principals, Emile C. Mathis, President of the Matam Corporation, Long Island City, N. Y., and Amicus Most, General Manager of the old Parkway Foundry Company, New York City.

The new company, which will produce non-ferrous castings by the sand, permanent mold and centrifugal methods, is occupying a new plant at 59 Paidge Avenue, Brooklyn, which provides more than 120,000 square feet of area. The most modern equipment is being installed, along with complete mechanical conveying devices, laboratory, heat-treating plant and pattern shop, the announcement states.

The company has a staff of qualified experts in the foundry field who will administer operations. Production has already begun in the new plant.

G.I. Bill Does Not Guarantee lobs

Employers conducting on-the-job training programs under the G. I. Bill need not guarantee veterans jobs on completion of their training, Veterans Administration has announced in a new circular to its field offices. The directive was published in answer to queries of employers



Have you a noisy gear train to correct? Try an Atlantic noiseless gear, accurately cut of nonmetallic Bakelite.

Atlantic makes gears rigidly to your specifications, proven by precision inspection before delivery. All types, all gear materials, all sixes to 60", all quantities. The same close personal attention to orders, whether it's one gear or a hundred. Send us your specifications or gear samples for our quotations and delivery dates.

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BURKE MILLING MACHINES



No. 4 Motor Driven MILLING MACHINE Mounted on Cabinet Column

Burke motor driven milling machines Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

Write for complete information.

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who feared they could not maintain their job training programs because they would be forced to guarantee veterans jobs regardless of circumstances.

The circular states:

"No employer is expected to guarantee a job to a veteran who fails to demonstrate during the course of his training that he will merit employment. Neither is an employer-trainer expected to guarantee a position against unforseeable circumstances which may arise and make it necessary for him to reduce his force or at least not to expand it."

The circular explains that VA will continue to protect the interests of the veteran taking one-the-job training by preventing the employer from offering him such training when there is reason to believe that employment will not be available when the course has been completed.

The directive also states that VA will not interfere with existing practices of recognized on-the-job training establishments in which veterans are enrolled. This provision was included after some training institutions expressed the belief that VA training officers might exercise supervision over long established organizations that have had training courses for years.

In clarifying the functions of VA training officers, the statement explains that they will obtain information on veteran attendance and progress from recognized institutions only if the training establishments are unable to furnish regular reports. These reports, submitted by training institutions, contain data on student attendance and grades of veterans who are training under the G. I. Bill.

This directive clarifies a circular issued by VA on March 14 establishing methods of supervising veterans enrolled for training at Government expense.

The Servicemen's Readjustment Act (G. I. Bill) places upon each state the responsibility for approving training establishments, but makes VA responsible for seeing that veterans actually are pursuing a course of training and are progressing satisfactorily while receiving subsistence payments. To determine veteran's eligibility for these payments, VA regional managers are required to obtain regular reports of conduct and progress in training on-the-job.

These requirements have been in effect for more than a year and are not changed by recent directives.









FTAL PARTS, tools and equipment that require identifying letters or figures can be quickly, neatly and accurately stamped with this Mercury Type Holder. It eliminates a dozen part numbering problems encountered with single-character stamps, including such costly errors as wrong sequence, damaged parts and illegible numbers — because it is fool-proof!

The Mercury holds the entire part number — as many as 20 characters, if needed. Each character is held in rigid alignment, and is so constructed that it cannot be placed in the holder upside down. Simply snapping the type in place in the holder locks the type, ready for stamping. Then, placing the type on the part and striking

the anvil with a hammer stamps the full part number. It's fast, accurate and easy! Five type sizes can be accommodated in the Mercury Holder to give you a wide selection to meet any numbering need. With a single holder and various type sizes, you're ready for almost any numbering job. The Mercury Holder is compact to permit numbering small parts...is of all-steel machined construction...has just four simple parts. Hardened and ground hand-cut steel type is available in a complete range of sizes.

Specifications, ordering data and full descriptions on all sizes are available for the asking. Both hand and press style holders can be supplied. Write for Bulletin S today!

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TORIT DUST COLLECTORS

remove abrasive and polishing dusts at the machine and recirculate the air back into the room.

TORIT Dust Collectors are designed to meet the exacting requirements of modern industrial operations. Self-contained and portable they can easily be fitted into present and future production layouts.

TORIT Dust Collectors range in size from 1/3 HP to 3 HP. Applied at the machine they eliminate extensive piping and reduce power consumption. They are the perfect answer to

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MARVEL TOOL & MACHINE COMPANY

June, 1946

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MODERN MACHINE SHOP

OUPRA

Cincinnati Hydromatic Milling Machines

The Cincinnati Milling Machine Co., Cincinnati 9, Ohio, announces a line of Hydromatic Milling Machines of unusually heavy and powerful construction with increased cutting capacity and higher spindle speeds than heretofore for high speed carbide milling. Like the superseded models, the new machines are of bed-type construction, with automatic table feed cycles and infinitely variable hydraulic table feeds.

Standard machines are build in plain and duplex styles and in 12 sizes from No. 3-24 (24-inch table traverse, 71/2 h. p.) to No. 56-90 (90-inch table traverse, 30 h. p.). More powerful motors in the proper frame sizes can be used for special applications.

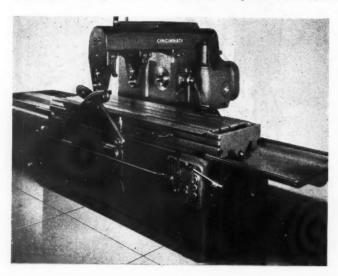
Principal castings-the bed, table, headstock, and spindle carrier-are especially heavy. Tables are 2 inches wider than before, thus affording increased work and fixture clamping area. Ways are square gibbed. Along with the heavier headstock and spindle carrier castings, the drive is also much heavier, with wider faced gears, larger shafts and bearings, and a much heavier spindle. To assure a smooth flow of power to the spindle, the entire speed transmission, including the pick-off gears, are spiral bevel, or helical.

The overarm of the improved Hydromatic is a built-in unit which arrests vibration at the outer end of the arbor. thus greatly reducing the need for supplementary support through the arbor support braces. A choice of seven ranges of spindle speeds is available for each machine. The highest group ranges from 164 to 1,225 r. p. m. for small spindle carriers, 137 to 1,000 r. p. m. for medium spindle carriers, and 110 to 820 r. p. m.

for large spindle carriers. Eight speeds are available within each

range.

With the exception of four minor oil cups (eight on duplex machines) lubrication is completely automatic. Spindle carrier parts are lubricated by a circulating pump and reservoir within the system from a unit. Gears and bearings in the clutch and bevel gear unit are splash lubricated. while the arbor bearing collar is



Cincinnati Plain Hydromatic Milling Machine

Cincinnati Duplex Hydromatic Milling Machine

lubricated by gravity from a reservoir within the arbor support. Table ways and bearings within the bed are pressure lubricated by a pump driven from the clutch unit. This pump receives oil from a two-gallon sheet metal reservoir located in the headstock. In addition to a conventional sight level gage, the reservoir is equipped with a float switch to automatically stop the driving motor if the oil should be exhausted below the low limit.

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Electrical controls are built into a compartment in the right-hand headstock. The door to this compartment is provided with an automotive type lock and also

incorporates an externally operated disconnect switch which must be in the "off" position before the panel door can be opened. A small contact button built

CLARKATOR CHECKS DIAL



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CLARK INSTRUMENT, INC.

10200 Ford Road.

Dearborn, Mich.

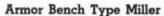


into the motor compartment automatically stops the motor when the hinged cover is opened. Controls include coils which reduce the current to 110 volts at the push-button station. Push buttons are built-in and located centrally with the manual control levers.

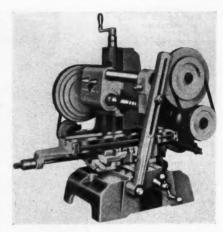
Coolant equipment incorporates a threeway switch, offering the operator a selection of continuous flow or automatic start and stop with the spindle rotation. A small start-stop lever, located in the manual control group, provides for releasing of the hydraulic pressure which engages and disengages the spindle drive clutch. Also included in the control lever group are a four-position table control lever (rapid traverse and feed right and left), table stop, and automatic spindle stop.

Leveling jacks are built into the base of each Hydromatic so as to aid in maintaining alignments, especially on long

bed or duplex style machines.



Weighing 320 lbs. stripped, a bench type milling machine having a rise and fall spindle, thereby eliminating the use



Armor Bench Type Milling Machine

of a knee, is now being marketed under the trade name of Armor by the Aircraft Machinery Corp., Burbank, Calif. The horizontal spindle is designed with standard lathe threads externally for mounting chucks, faceplates, and so on, and is



Die Cushions

For Every Punch Press Requirement

For deep drawing operations.
For pressure pad control on form dies.

For stripping blanks and ejecting slugs.

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Other Elgin Sapphire contact points can be furnished to your specifications to fit any dial indicator. Shown here are a few representative shapes.











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arranged to swing 22 inches. Small bar stock can be fed through the tapered

spindle.

Hand screw feed is standard equipment of the machine, however, a lever feed assembly can be used by the operator in place of the lead screw, converting the machine from tool to production milling. A fully automatic power feed is available for driving the table in either direction, independent of spindle rotation, through a totally enclosed, reversible gearbox. Geared power feeds are obtainable from 14 inch per minute for high speed milling cutters through 32 steps to a 15-inch feed for carbide-tipped cutters. These feeds are available from 0.0015 to 0.013 inch per spindle revolution. Eight spindle speeds provide a range from 98 to 1,150 r. p. m. through double-belted cast iron pulleys. A back gear accessory provides a low spindle speed of 33 r. p. m.

Adaptable for use with a one or smaller horsepower motor, the Armor Bench Type Milling Machine is claimed to be practically vibration free due to the rigidity of the semi-steel cast frame. The vertical lead screw is provided with ball bearings to withstand resistance of the load, and self-lubrication bearings with oil reservoirs are employed at other points. The

machine has a 12-inch longitudinal travel, 10-inch vertical travel, and 7-inch cross travel. All three lead screws are equipped with accurate micrometer dials and 4-inch cranks which provide maximum leverage for turning the screws. A heavy duty vertical attachment is available for converting the horizontal machine into a standard vertical miller, the attachment being available in two types.

Landis No. 1 Universal Centerless Thread Grinder

Announced by The Landis Machine Co., Waynesboro, Pa., the Landis No. 1 Universal Centerless Thread Grinder illustrated herewith can be used for grinding screw threads on straight cylindrical workpieces as well as on headed or multiple diameter parts. The machine incorporates all of the necessary mechanisms and controls for grinding by either the "Thrufeed Method" or "Infeed Method," it being necessary only to apply the proper tooling for any specific operation.

Single diameter workpieces, such as set screws, long rods, and rings, are thread



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This picture shows how a RUSNOK head is used to convert an idle surface grinder into a modern milling, drilling, boring machine capable of performing a wide range of high speed, precision operations. Uses many types of cutters on a wide range of work. Easily mounted—tilts to any angle. Large size spindle (No. 9 B & S taper). Takes 1/16" to ¾" end mills. Large quill with 4" travel, counter balanced, hardened and ground. Six speeds 250 to 3000 RPM. Lever and worm feeds. ½ h.p. motor. Specially engineered by RUSNOK to meet modern demands for high speed, high precision, heavy duty end mill operations. Prompt delivery.

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If you want to make the boss "stand up and take notice" just show him the grinding and finishing you can do with 3M Abrasive Belts and a 3M Segment Face Contact Wheel. These two 3M developments make it easy to turn out the finest work anyone can ask, on either flat or curved surfaces, at production line speed. The firm segmented face and cushioned center of the patented

contact wheels give 3M Abrasive Belts just the right support for fastest cutting with the least pressure, without arm-tiring jolts and jars. You will turn out more work and better work, with fewer stops to change belts. Ask your distributor to give you the whole story on these 3M Products, or return the coupon for our free booklet.

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1946

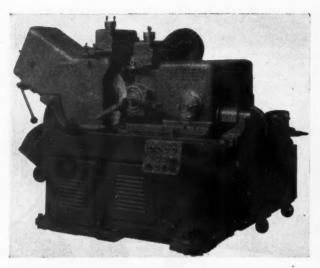
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Landis No. 1 Universal Centerless Thread Grinder

The Landis No. 1 Universal Centerless Thread Grinder is of sturdy construction and designed to provide for maximum convenience in setting up as well as in operation. Grinding and controls wheels can be dressed without disturbing the setup and. when the unit is equipped with an extra coolant tank, a complete change in coolant can be made in a few minutes. The operating controls are centralized at the front of the machine. and all mechanisms are enclosed.

The grinding wheel spindle is 4½ inches in diameter and rotates in multiple shoe, self-adjusting, heavy duty bearings mounted directly in the bed of the machine. The spindle is pressure lubricated with filtered, continuously circulating oil. The electrical controls of the grinding wheel driving motor are interlocked with the spindle lubricating system to ensure an adequate supply of oil at correct pressure. Any failure in the lubricating system for the spindle bearings automatically stops the machine.

The grinding wheel is driven through V-belts by a constant speed 15 h. p. motor mounted on a hinged structure that provides a convenient means to adjust the belt tension without the use of idlers.

The control wheel spindle rotates on precision preloaded ball bearings and is

ground by passing the workpieces in a continuous flow between the grinding and regulating wheels. This method of grinding screw threads on the centerless thread grinder is known as the "Thrufeed Method" and can be used to grind threads from either solid blanks or to finish threads precut prior to centerless thread grinding.

Headed or shouldered workpieces, such as cap screws, headed adjusting screws, stripper bolts, and similar multiple diameter parts, are centerless thread ground by the "Infeed Method." This type of operation completes the entire thread in approximately one and one-half revolutions of the workpiece. The workpieces are placed between the wheels one at a time and are automatically ejected at the completion of thread grinding operation.

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The Hjorth Bench Lathe has the speed, accuracy, handling ease, and dependability that appeals to every operator. That's why you'll find the better shops equipping with the Hjorth Lathe.

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mounted in a swivable housing. An electronically controlled drive provides an infinitely variable working speed range to the control wheel and a preselected fixed speed for dressing the wheel. The final drive to the spindle is through a worm and worm wheel.

The thrufeed and infeed workrests are adjustable for any helix angle within the range of the machine. A convenient means, including a master gage, is provided for quick and accurate adjust-

ments.

A profile diamond type dresser is mounted over the grinding wheel and a similar dresser over the control wheel. Each dresser may be equipped with a profile cam to form the faces of the wheels to any desired contour. When only straight faces on the wheels are required, the profile cams may be locked out of engagement to permit the dressers to function as simple diamond devices.

A heavy duty automatic crush dresser is attached directly to the bed of the machine for generating the thread forms on the grinding wheel. A geared motor is incorporated in the dresser for driving the crusher roll and grinding wheel at a slow speed when dressing. The motor control is interlocked with the main driving motor controls to prevent contact

between grinding wheel and crusher roll when the grinding wheel is rotating, thus avoiding any possible damage to the crusher roll. The mechanism in the crush dresser permits preselecting the depth of penetration when crushing, the crusher automatically stopping when the desired penetration is reached.

A large micrometer dial and handwheel is built into the upper slide for size adjustments. The dial reads in 0.0001 inch on the diameter of the workpiece and can be set to zero position whenever desired. The handwheel is used for making corrections for both grinding wheel and control wheel wear. A crank may be used for rapidly moving the machine slides when setting up or changing wheels.

The coolant tank has a capacity of 65 gallons and has a 1 h.p. centrifugal circulating pump mounted at one end. A system of baffles is built into the tank, and a filtering unit can be inserted when

required.

The electrical control push buttons are grouped on a single panel, conveniently located at the front of the machine. A master stop button is included in the controls so that the entire machine may be stopped in one operation. The grinding wheel, control wheel, and coolant pump may be operated as independent



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TALIDE METAL MEETS EVERY REQUIREMENT



Rolling Mill Work Rolls



Hardest man-made metal.

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On any cutting, drawing, or wear resistance application, you can increase production many times and cut costs as much as half. Cutting tools of Talide cut 2 to 3 times faster than high speed tool steel. Talide drawing dies and wear resistance parts usually outwear steel by at least 50 to 1.

Send us parts or prints and we will show you how this hardest man-made metal can improve your production. If you prefer, a Talide sales engineer

will call at your office.



units when setting up. A potentiometer for adjusting the speed of the control wheel and pilot lights are included on the control panel. All elements of the electrical system are fully enclosed and operate on a 110-volt pilot circuit.

An automatic hopper is available for feeding workpieces such as headless set screws and short rods for thrufeed thread grinding. When equipped with an automatic hopper, the machine is fully automatic in operation except for dressing the wheels and making size adjustments.

"Warco" All-Steel Welded Press

Production of a complete line of allsteel welded presses for the automotive, refrigeration, furniture, storage container, and other industries utilizing stampings is announced by the Warren City Manufacturing Co., Warren, Ohio. Known as "Warro," the line comprises mechanical open back inclinable presses ranging in size from 50 to 150 tons capacity; mechanical and hydraulic metalworking presses with capacities from 100 to 1,200 tons; and mechanical press brakes in sizes from 100 to 500 tons and designed to handle work up to 24 feet in length.

Both the mechanical and hydraulic metal-working presses are offered in eccentric gear models with solid or tie-rod frames of welded steel so as to provide maximum rigidity essential to long die life. Weldments are stress relieved to prevent "locked-up" stresses and future misalignment. Slides are of welded steel and are guided in long bronze-lined gibways to further prolong die life. Slides are adjustable by means of motors equipped with magnetic-type brakes for automatically locking adjustments. Pneumatic cylinders counter-balance the weight of the slides and dies.

The eccentric gear models are each equipped with a double-geared twin drive having bull gears of the eccentric type which rotate on a straight pin. All gears are of steel, the high speed gears being of the herringbone type and operating in an oil bath so as to ensure constant lubrication. The clutch and brake unit is of the friction-disc mechanically-interlocked type, with the clutch being air actuated and the brake, spring actuated. The clutch is controlled electrically by push buttons with a selector switch having "off," "long," "short," "inch," and



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June, 1946

MODERN MACHINE SHOP



SAVE MONEY INCREASE PRODUCTION ON DRILLING Small Precision Holes

THE Lord & Davis Supersensitive Drill Press saves money for you because it cuts production costs and increases your output. It gives you maximum accuracy on small hole production drilling.

A floating spindle under supersensitive control permits the drill to be fed with an ounce of pressure. The operator can easily feed the drill at the exact rate required. Consequently, drill breakage and work spoilage are eliminated and production costs cut down. Easy operation reduces operator fatigue and steps up production. Accurate drilling of small holes is assured.

For more accurate and more economical drilling of small diameter holes, use the Lord & Davis Supersensitive Drill Press. Save money . . . get better work . . . and more of it. Write today for folder.

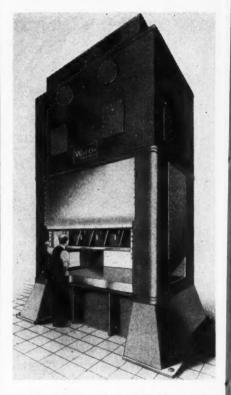
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Sole Distributor for U.S.A. and Export

Z. W. BROUILLARD & CO., Springfield 9, Mass.

"continuous" positions. The control also has a non-repeat feature.

The eccentric gear presses have strokes ranging from 8 to 36 inches and distances



"Warco" Two-Point Eccentric Gear Press

between housings ranging from 42 to 156 inches and greater. Die cushions are provided as built-in units, guided in bronzelined gibways in the press beds.

The Warco Open Back Inclinable Presses feature a frame construction similar to the eccentric gear models, thus affording maximum rigidity. The slides of these presses operate in extra-long gibways for proper die alignment. The heat-treated steel forgings having extra large crankpins. All crank bearings are bronze bushed and of split cap design.

The clutch and brake units of the open back inclinable models are the same as on the eccentric gear models. The flyalsc okes

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your Best Buy for All-Purpose Hand Sawing RIFFIN Soft Center Blades are unique - exclusive with Griffin. Flexible as a soft-back blade, tough as an all-hard. Will not bind, sag or shatter. Extra hard expertly milled teeth, soft but very tough center, stiffened back. Hand sizes—for wide range of uses. OTHER GRIFFIN BEST BUYS Griffin Tungsten High Speed Steel Blades for cutting very toughest alloys . . . Griffin Molybdenum High Speed Steel Blades for economical general production metal sawing . . . Griffin Non-Strip-teeth do not break out when sawing thinnest sheet or tubing-hand frame sizes . . . Write for latest Price List. JOHN H. GRAHAM & CO., Inc. General Sales Agent-105 Duane St., New York 8, N. Y. Hack Saw Blades MADE BY G. W. GRIFFIN CO., FRANKLIN, N. H. Hack and Coping Saw Blade Specialists Since 1880

June, 1946

MODERN MACHINE SHOP

CERROSAFE

Makes Wood Patterns and

Core Boxes

LAST LONGER

Cerrosafe, melting range—160°-190° F. can be sprayed on wood patterns and core boxes by means of an electrically heated spray-gun*. This coating resists moisture, wear and prevents warpage. Simplifies alteration of patterns.

Cerrosafe, when cast or sprayed, reproduces fine detail. Used for making duplicate patterns and as master models for engraving machines with low stylus pressures.

*Spray gun information sent on request.

OTHER LOW-TEMPERATURE-MELTING ALLOYS

CERROBASE

Melting Temp. 255° F.

CERROBEND

Melting Temp. 158° F.

CERROMATRIX

Melting Range 217° F.-440° F.

CERROTRU

Melting Temp. 281° F.

CERROLOW—117

Melting Temp. 117° F.

CERROLOW-136

Melting Temp. 136° F.

CERROSEAL

Melting Temp. 255° F.

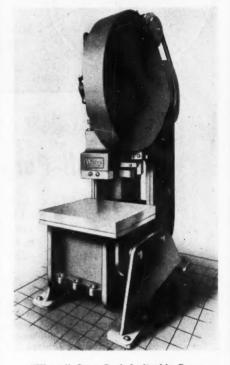
Write for name of nearest distributor.

CERRO DE PASCO COPPER CORPORATION

40 Wall St.

New York 5, New York

wheel and clutch and brake unit of each press is mounted on the backshaft between the housing plates of the body. The clutch is electrically controlled by push buttons having a selector switch for "once," "inch," and "continuous" operation. The crankshaft, backshaft, and gibway bearings are lubricated with grease from near floor level.



"Warco" Open Back Inclinable Press

The open back inclinable presses are of mechanical design with strokes ranging from 4 to 14 inches. Provision is made for mounting die cushions in the press beds.

DoAll Zephyr 16 High Speed Metal-Cutting Band Saw

Designed primarily for light gauge steel and foundry application, the DoAll Zephyr 16 High Speed Metal-Cutting Band Saw now being marketed by The COOLANT

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, 1946

FULFLO

BY-PASS VALVES



JUST SET THE FLOW . . .
THE COOLANT WILL
TAKE CARE OF ITSELF

Astonishingly efficient because precision - designed and precision-built . . . accurate . . . dependable . . . and with practically no maintenance cost or worries.

FULFLO PUMPS furnish a specified, uniform, continuous flow of the coolant medium and reduce work spoilage to the minimum.

Pipe sizes from 3/8" to 11/2".

FULFLO COOLANT CENTRIFUGAL PUMPS

Also makers of
FULFLO BY-PASS,
OIL-RELIEF VALVES
for machine tool
and oil-hydraulic
mechanisms.



Write on your letterhead for Fulflo Mechanical Data Book.



Specialties Co., Inc.

June, 1946

MODERN MACHINE SHOP

INSIDE STORY

of extra vise strength





Extra strength where you need it most... inside at the heart of the vise... comes from Parker's oversize screw and nut. Screw is one-piece steel – nut made of highest grade malleable iron. Ask your distributor about the 5 big other advantages of Parker Vises! The Charles Parker Company, Meriden, Connecticut.





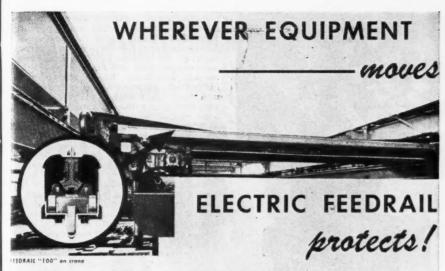
Close-up view of DoAll Zephyr 16 High Speed Metal-Cutting Band Saw in operation

DoAll Co., 1306 S. Washington Ave., Minneapolis 4, Minn., has a 16-inch throat depth and 10-inch thickness capacity and is provided with an infinitely variable speed range of from 1,000 to 5,000 feet per minute.

According to the manufacturer, the

DoAll Zephyr 16 High Speed Metal-Cutting Band Saw





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FEEDRAIL on cutting and moving cloth laying machine

Whenever you see exposed wires on a crane system, wires on the floor or awkward motions of portable tool operators — think of FEEDRAIL.

CRANES AND HOISTS

Electric Feedrail is an enclosed bus bar system having movable trolleys that make contact with the bus bars at all times. It is polarized, fused and grounded and each section carries the Underwriters' Label.

FEEDRAIL is protected against dust, mechanical injuries and mechanical shorts. It is furnished in assembled sections and curves. Also available for Slide Switches and transfers. Easy to install, inspect and service.

PORTABLE TOOLS

FEEDRAIL not only feeds but also supports all types of portable tools which may be readily disconnected by means of fused EVER-LOK connectors.

TEST RACKS

or any electrical equipment that has to be moved or rearranged to accommodate new production layouts is best served by FEEDRAIL.

ASK FOR FEEDRAIL CATALOGS GENERAL No. 15, NEEDLE TRADES No. 16, MACHINE TOOL No. 17



fEDRAIL on machine bool

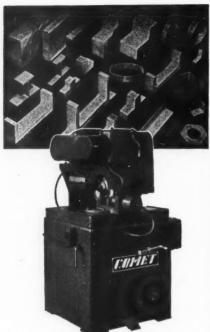
ELECTRIC FEFORALL

FEEDRAIL CORPORATION

Subsidiary of Russell & Stall Company

125 BARCLAY STREET . NEW YORK 7, N. Y.

, 1946



CUTS METAL FASTER More accurately

If you require accurate, high-speed cutting of non-ferrous metals and other materials, here is your machine. Cuts by smooth, fast, milling action. Pneumatic hydraulic feed is coordinated with speed of cutting blade. Vise synchronized with action of ram. No vibration because of weight distribution. Has 4 speed transmission and variable feed mechanism. Built-in coolant system. Properly operated, blade breakage is eliminated. Write or wire for free literature.

CONSOLIDATED MACHINERY & SUPPLY CO., LTD. 2031 SANTA FE AVE., LOS ANGELES, 21, CALIF.

MACHINE **AUTO MATIC** MODEL

combination of controlled saw speed and special DoAll saw blade make possible very fast cutting rates in sheet steel, aluminum, and ferrous and non-ferrous castings, as well as plastics, laminates, composition and other materials. Steel springs and links, flexible steel tubing, laminated rubber and steel or aluminum and wood, combinations of steel and copper, steel and rubber tubing or porcelain steel can all be sawed on the Zephyr 16 with speed and good finish, it is claimed. The machine is said to cut through 1/8inch stainless steel at 48.6 lineal inches per minute, 13 gauge sheet steel at 150 inches and 75 ST aluminum at 100 square

The table of the Zephyr 16 is of the tilting type and can be equipped with a disc cutting attachment for making circles, a rip fence, and a mitering attachment for the cutting of regular and compound angles. Hardened steel saw guides with roller back-up bearing are said to hold the blade firmly for making straight true cuts to close tolerances.

Lincoln SA-1200 Welder

Designated as the SA-1200, a welder of 1200 amperes comprising two 600-ampere generators close-coupled to an a.c. induction motor and equipped with complete motor control is announced by The Lincoln Electric Co., Cleveland 1, Ohio, for use with the company's recently introduced "Lincolnweld" process of automatic metallic shielded arc welding. The unit is of arc welded steel, dripproof construction and is completely wired, ready for connection to the a.c. power source and "Lincolnweld" head of the stationary, self-propelled carriage or tractor type.

Generators are of the variable voltage type with completely laminated magnetic circuits (frame and pole pieces) and equipped with interpoles. They require no external reactance or stabilizer. Armatures are insulated with glass and mica insulation to permit sustained operation at high loads. Interpoles are insulated with asbestos.

The motor is of the squirrel cage induction type arranged for Y-Delta starting. The size of the motor is ample for heavy overloads. Connection is for 220. 440, or 550 volts, three or two phase, 60 or 50 cycles.

The starter is a Y-Delta type, having two switches operated from one push button. located on the side of the control cabinet. These switches make connecand sible steel, rrous ates. Steel bing, inum copelain yr 16 imed. h 1/8nches t 150 quare

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having push control onnec-







Figure how much you spend each year for Small Tools and then consider how much you could have saved by using Cleveland Quality products.

It's not how much you pay for Small Tools that determines their ultimate cost, it's the service they render.

Write for a copy of our Small Tool Hand Book.





tions on the stator winding so that the

"Y" connection is used for bringing the

machine up to speed with one third of

the normal across the line inrush cur-

rent. When the machine approaches

full speed, a transfer relay energized from the time delay switch circuit makes

connections such that the "Y" start

switch opens and the "delta" run switch

closes, thus closing connections which

provide the motor its full power for driv-

ing the generators. The push button circuit is arranged so that the green

(start) button must be held in until

after the "delta" run switch has closed,

Lincoln SA-1200 Welder

which occurs when welder reaches full speed.

The a.c. motor is protected by a special protective device operated by both temperature and current. This device, consisting of three current transformers and

three thermostats mounted on the laminations of the motor frame, affords protection against burn-out of the motor from all usual causes such as high room temperature plus overload, abnormally high or low voltage, or abnormally high current due to single phase or unbalance phase conditions. The thermostats reset when the motor returns to a safe temperature and no manual operation is required to restart the machine other than pushing the start button.

The welder weighs 3,200 lb. and is designed for easy mounting by means of

four feet, two on each side.

DESMOND GRINDING WHEEL DRESSERS ...



Correct method of using Huntington Dresser.

You can increase your grinding production by dressing your wheels regularly with Desmond Dressers.

We manufacture the only complete line of dressers and will be glad to send any of them to you for trial or advise the type and size you should use.

Write today for a copy of our catalog "M" and name of your nearest dealer.

THE DESMOND-STEPHAN MFG. CO.



June, 1946

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, 1946

MODERN MACHINE SHOP 241

PREVENT

Skin Irritations

FROM OILS, SOLVENTS, ETC.

use M.S.A

FEND-E

BARRIER PROTECTIVE CREAM FOR THE WORKER'S SKIN

M.S.A. FEND-E is a light, easy-touse industrial skin cream that forms an effective barrier on the skin against irritation from cutting and cooling oils, solvents, degreasers, etc. Rub it on before work—remove it with just soap and warm water! Thousands use FEND-E... try it!



GENTL	EMEN:	A	FREE	SAMPLE	JAR
OF	FEND-I	Ξ,	PLEAS	E	

Name

Company.

MINE SAFETY APPLIANCES CO.

Braddock, Thomas and Meade Sts.

Pittsburgh 8, Pa.

Motch & Merryweather No. 00 Metal Cut-Off Saw

Designated as the No. 00, a metal cutoff saw for ferrous bars up to $1\frac{1}{4}$ inches, non-ferrous bars up to 2 inches, and tubing and shapes up to $2\frac{1}{2}$ inches has been brought out by The Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, Ohio. The machine is avail-



Motch & Merryweather No. 00 Metal Cut-Off Saw

able with either hand or power feed to the saw carriage or can be equipped with automatic cycling to both the work and feed.

Features of the machine include a long lever arm feed for ease of manual operation; "Triple-Chip" saw blade; spring tension cam-operated mechanism linked to the feed lever for automatic clamping; quickly adjustable vise jaw; smooth saw blade drive; anti-friction bearing spindle and drive shaft; built-in coolant system; and large accessible chip compartment.

Specifications of the Motch & Merryweather No. 00 Metal Cut-Off Machine are as follows: saw blade diameter, 8 coolant worries
when you specify



GUSHER COOLANT PUMPS

You can go far to eliminate coolant troubles when you specify Ruthman Gusher Coolant Pumps for your machine. Simple in design with fewer parts, efficient in operation at moderate cost, they contain many patented features unobtainable on anything but a Ruthman Gusher Coolant Pump.

So, the next time you order metal cutting machinery or replacement units, specify Ruthman Gusher Coolant Pumps.

THE RUTHMAN MACHINERY CO.

1817 READING ROAD CINCINNATI 2, OHIO

THE "GUSHER"

A MODERN PUMP FOR MODERN MACHINE TOOLS

June, 1946

MODERN MACHINE SHOP

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and 10 inches; saw blade speeds (in s. f. p. m.), 160, 247, and 560 optional; main drive motor, $1\frac{1}{2}$ h. p.; coolant pump motor, 1/20 h. p.; pulley speed, 622 r. p. m.; saw blade bore, 1.375 inches; saw blade collar (diameter), 2.750 inches; floor space $20\frac{1}{2}$ x 29 inches; weight, approximately 1.150 pounds.

Photoswitch Type 2T15U Repeat-Cycle Timer

Described as a rugged industrial electronic timer designed for machinery and process control, the Photoswitch Type 2T15U Repeat-Cycle Timer illustrated herewith, product of Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass., is recommended for applications requiring two adjustable timing periods to run in a continuous cycle. This cycle is initiated by either momentary or sustained contacts, and provision for automatic recycling is provided. Each timing period is adjustable from 1/20 second to 2 minutes. Control is accomplished through specially designed snap-action relays which result in extreme accuracy and interchangeability. Interval variations in

repeat-cycle timing are said to be less than 2 per cent.

The Photoswitch Type 2T15U Timer is



Photoswitch Type 2T15U Repeat-Cycle Timer with Small Dial Housing

universally for six maximum time ranges from 1.5 seconds to 2 minutes for each period of the cycle. Each range is represented by a timing element which is snapped into a clip on the front of the control. The timer may then be set for any intervals up to these maximums by dials which are located either on the timer itself or in a small housing at a more convenient location.



AMAZING! INCONCEIVABLE! UNBELIEVABLE!

NEW PRE-SHARPENED SHEARCUTTER TOOL BIT

Actual photo-graph of a 3/8" SHEARCUTTER Tool Bit in pro-duction taking a finishing cut 1 1/8" deep un-der power feed. (3" Diames. C.R.S., 300 RPM, .005 Feed, Cutting Speed 240 FPM.)



THIS AMAZING NEW INVENTION

- . Saves from 10% to 50% on labor costs.
- Increases production from 50% to 100%.
- · Decreases power consumption from 30% to 70%.
- · Takes extremely deep cuts with remarkable ease.
- Lasts from 3 to 5 times longer between regrinds paying for itself from savings in regrinding time alone.
- · Generates less heat and saves on cutting compounds.
- · Tends to resharpen itself automatically.
- · Gives smoother finish and greater accuracy.
- Fits standard tool holders.
- · Is interchangeable with less efficient tool bits.
- May be used on ferrous and non-ferrous metals, alloys and plastics.

YOU CANNOT AFFORD NOT TO USE THESE TOOL BITS!!

PATENT WARNING! Protected by numer-ous patent applications. Infringers will be prosecuted.



THE SHEARCUTTER PRINCIPLE Illustrated at left is the conventional type of tool bit, breaking down or tearing the metal. At right: The slicing knife-like ac-tion of Shearcutter Tool Bits.

RLESS TOO

1234 S. GRAMERCY PLACE, DEPT. A, LOS ANGELES 6, CALIFORNIA DISTRIBUTORS WANTED

June, 1946

MODERN MACHINE SHOP

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Sheffield Multiple-Spindle Precisionaire

A multiple-spindle Precisionaire for simultaneously gaging bore diameters of an automobile cylinder block at 32 points for "go" and "not go" and proper classification has been developed by The Sheffield Corp., Dayton 1, Ohio. Weighing several thousand pounds and approximately four feet wide x eight feet x seven feet high, the device utilizes a flow of air to accurately measure to one ten-

The operator of this huge 32-tube Precisionaire is setting the minimum tolerance limits of the four right-hand tubes with the minimum master.

thousandth of an inch.

Designed expressly for use as an integral part of a production line, the Sheffield Multiple - Spindle Precisionaire is constructed to check for diameter, taper, and out-of-roundness of eight cylinder bores of an automobile engine block at four dif-ferent points in each cylinder and to accurately classify them to 0.0003 inch.

The engine blocks are brought to the gage by the conveyor line then

checked, and passed down the line to the next operation. The cycle begins with one block in loading position. As the starting button is depressed, loading arms pick up the block and advance it to the gaging position where two hydraulic plungers locate the block and hold it in place. As an additional precaution, a shot bolt enters the locating hole in the top of the block and ensures proper location.

Now accurately aligned, the eight cylinder bores are entered by eight spindle assemblies which elevate automatically. Each assembly consists of four

Presto! Your Bench or Engine Lathe BECOMES A TURRET LATHE

Several sizes for converting up to 24" swing. For forming, roughing, boring, drilling, tapping, finishing, etc., without stopping lathe or changing tools.

Send for catalog of Dividing Heads, Belt Sanders, Swing Grinders, Turret Attachments, Etc.

JEFFERSON MACHINE TOOL CO. 702 W. 4th St., Cincinnati 3, Ohio



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HEAT TREAT
SMALL PARTS

In Your Own Plant

ESSENTIAL FOR TOOL AND DIE SHOPS

You save time and money heat treating small tools and dies in a Cooley Electric Furnace. Uniform temperatures are maintained throughout the furnace chamber to assure even heating of parts. The heating elements are embedded in refractory materials, protecting against atmospheric attack. They are easily replaceable.

ECONOMICAL TO OPERATE

To hold 1600° F. in the MH-3 furnace requires less than 2 kw. At power rate of 2c per kw.-hr., operating cost is under 4c per hour. The MH-4 furnace requires less than 2.5 kw. or under 5c per hour at the same rate. Cooley Furnaces are easily installed—ready for immediate service by connecting power lines to two terminals. Quiet in operation—no fumes or odors—no ventilating necessary—they can be located at any convenient place in the shop.



TWO NEW OPTIONAL FEATURES AVAILABLE



 Vertical Lift Door — Counter weighted for ease of operation—conserves heat where door need not be fully opened to enter or remove work. Supplied in place of standard hinged hearth door at \$20.00 additional to regular furnace prices shown below.

AVAILABLE IN TWO SIZES

Туре	Amps 115 V	Watts	Amps 230 V	Price
MH-3 MH-4	29.6	3400 4800 *Inchy	20.9	\$146.00* \$222.50* rth Plate

MAX. SAFE TEMPERATURE—Continuous operation, 1750° F.; Intermittent operation, 1850° F. AUTOMATIC CONTROL—Indicating Controlling Pyrometer—Thermo-couple and lead wire—approximately \$150.00.



NO SALESMEN WILL CALL

Ask for free information and ordering instructions so you can make your own decision and determine your own requirements. Write for Bulletin No. 50 today—no obligation.



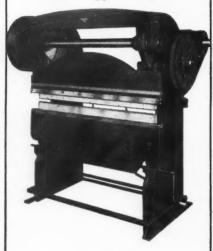
COOLEY ELECTRIC MANUFACTURING CORP.

34 South Shelby Street Indianapolis 7, Indiana Export Department, 1111 S. Ferry Building, New York 4, New York

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CHICAGO STEEL PRESS BRAKE

New Type "300"



SPEED PRODUCTION OF SHEET METAL WORK

USE FOR

FORMING 2. EMBOSSING
 MULTIPLE PIERCING

4. NOTCHING 5. BLANKING

The New Type "300" CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

DREIS & KRUMP MFG. CO.

7418 LOOMIS BLVD. • CHICAGO 36 ILLINOIS

spindles that float independently to allow for tolerances in hole spacing. Upon reaching the limit of travel, the spindles automatically stop and can be manually rotated through 180 degrees for out-of-round inspection. The spindles may be stopped at any point and rotated 180 degrees, if so desired. In the event interference is encountered by any one of the sets of spindles, the machine will stop and a red light indicates the incorrect cylinder bore.

Thirty-two Precisionaire indicating tubes are grouped and located at eye



Motor block is in gaging position and eight spindle assemblies are inside the cylinder bores. The dimensions checked at four points in each cylinder bore are indicated by the floats in the 32 tubes at the top.

level. Each of the eight spindle assemblies has four Precisionaire tubes to indicate its findings. A scale graduated in 0.0003 inch and marked off in selection sizes of numbers from 1 to 10 is located to the right of the right-hand tube in each set.

As the engine block is being gaged, the floats instantaneously fall in the tubes to a position opposite a number on the scale. The movable tolerance slide is positioned to determine if all four floats are within the out-of-round and taper limits which are 0.0007 inch. If so, the selection size is indicated by the number opposite the float in the right-hand tube.

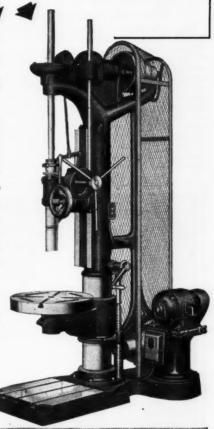
FAST-ACCURATE AND ECONOMICAL!

PRECISION WORK WITH STANDARD DRILLING MACHINES

Fast—Sibley Drilling Machines, available with 20, 24, and 28 inch swing, stand out in their field for simplified design that makes for fast, easy, accurate operation.

Accurate — Sibley Drilling Machines meet your requirements in producing to very close tolerances. Check the advantages Sibley Drilling Machines offer your production schedule.

Economical—Sibley Drilling Machines are listed at unusually low initial cost, give long and efficient service at highly remunerative rates. Exceptionally low maintenance.



JIBLEY MACHINE & FOUNDRY CORP.

DRILLING MACHINE MANUFACTURERS SINCE 1876

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This number is then manually stamped on the engine block directly beside the cylinder bore so classified. Stamping of the selection size of each bore is accomplished by a marking device mounted directly above each of the eight spindle assemblies. After all cylinder bores have been stamped, the spindle assemblies are retracted and the machine is ready to begin a new cycle.

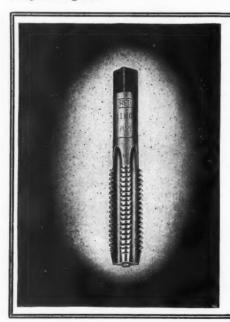
Alnor Model 8 Precision Dew Point Indicator

The Alnor Model 8 Precision Dew Point Indicator illustrated herewith, product of Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago 10, Ill., is described as a rapid, easily handled instrument with means for the very accurate, consistent observation of dew point indication with any non-corrosive gas. The instrument is said to have many uses in air conditioning and refrigeration work; in connection with controlled atmospheres in furnaces; and in the chemical industry, petroleum industry, papermaking industry, and the production of compressed gases.



Alnor Model 8 Precision Dew Point Indicator

According to the manufacturer, operation is simple and easy and an outstanding advantage of the Alnor Model 8 Dew Point Indicator is the fact that the indication takes place in an enclosed observation chamber under conditions which can be controlled and reproduced. Condensation takes place suspended in the air or gas chamber and the end point or vanishing point may be accurately observed, thus reducing errors due to the human element and permitting consistent deter-



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For better tapping at low cost use R & N the truly Modern Tap. They are ground from the solid High Speed Steel after hardening.

Our field engineers are willing and eager to assist you with competent counsel.

Next time try R & N Taps.

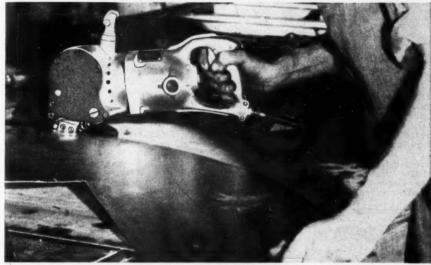
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LYKENS

PENNSYLVANIA

Cuts 12 gauge hot-rolled steel any shape... interior or exterior easy as cutting out paper dolls



Stanley UNISHEAR 144A

You can short-cut dozens of heavy sheet metal jobs every month with this portable tool that does a shop job right on the job. Cuts clean—curves, straight lines, angles and notches—right to the line in heavy 12 gauge hot rolled steel and heavier gauges of softer metals . . . at speed up to 15 feet per minute. Trims turned up edges close to the

surface. Makes inside cuts from a 3" starting hole. Light and easy to handle. Interchangeable, easily sharpened blades.

You need the money this UNISHEAR can save you. Ask your distributor for a demonstration or write for full information. Stanley Electric Tools, New Britain, Conn.

STANLEY Trade Mark

STANLEY UNISHEARS

Electrically Driven Metal Shears

June, 1946

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Readily portable and requiring no external cooling means or auxiliary apparatus, the Alnor Model 8 Precision Dew Point Indicator is available in two ranges for dew points between minus 20 deg. F. and room temperature and for dew points from minus 100 to 0 deg. F. The indicator is supplied completely mounted in a substantial carrying case with a detachable cover, as well as with a portable cord for electrical connection to a 110-volt a. c. power supply. Battery power can be furnished when specified.

Sudbury Sensitive Turret Attachment

Designed for use on all types of turret lathes, providing sensitive finger-tip control to taps, die heads, center drills, drills, end mills, and reamers, the Sudbury Sensitive Turret Attachment illustrated herewith has been brought out by the Sudbury Grinding Company, Sudbury, Mass. The attachment is constructed for attaching to one of the faces of the turret lathe and provides sensitive finger-tip control of all tapping operations from 6/32 to 4-inch tap. Other



Sudbury Sensitive Turret Attachment

operations, such as centering, drilling, reaming, and counterboring, are also said to be performed with the same ease and sensitive touch.

The Sudbury Sensitive Turret Attachment is ruggedly built for both light and heavy work and is designed to allow for rapid tool changing. The round front end of the ram has a No. 4 Morse taper hole with drift pin and shear pin holes, and is adaptable to all types of mountings.



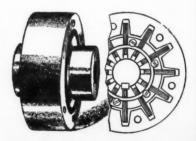
Each KANTILEVER COUPLING embodies five valuable features, each of which saves money for its owner. Like the ordinary Coupling it protects you against the evils of shaft misalignment but in addition develops a CUSHION TORQUE that absorbs the hammer blows of sudden loads and dampens the radial and torsional vibration that are largely responsible for the wear, fatigue, and failure of your Ball Bearings, Electric Motors, Speed Reducers, Gears, etc.

No other Coupling is like the KANTI-LEVER; it has a circular series of resilient Cantilevers made of 200,000 lb. Tool-Steel laminations operating in slots, the tapered sides of which stiffen the spokes under increased loads and eliminate backlash. Radial arrangement of spokes prevents end thrust; special end play available up to four inches with no increase in Cantilever stresses; outer periphery useful as a Brake Drum for quick-stopping machinery.

Send for Bulletin 28-M.



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70 LIMA GEARSHIFT DRIVES MACHINE CAPACITIES 270 20HP THE LIMA ELECTRIC MOTOR CO. 134 FINDLAY ROAD LIMA, OHIO REPRESENTATION IN MOST PRINCIPAL CITIES LIMA GEARSHIFT DRIVES LIMA PEDESTAL GRINDERS - LIMA ELECTRIC MOTORS

June, 1946

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LYON-Raymond Hydraulie HIGH-LIFT TRUCK

Lifts and transports skid loads

Tiers for space-saving storage
 ...and because of wide elevating range

Combines the functions of several pieces of equipment in a single, easy-to-handle Hydraulically - operated truck. Places tote boxes, offers rigid support for machine work, and positions! Learn how you can save time, money, and eliminate hazards in your plant this work-saving way.

Write for Descriptive Literature Today

LYON-Raymond Corporation

507 Madison St., Greene, N. Y.
Material Handling Equipment-Engineered Hydraulic Devices

Willey's Model 50-A Carbide Tool Grinder

Designated as the Model 50-A, a grinder for use in the rough, semi-finish, and finish grinding of carbide-tipped tools ranging up to a maximum of 2 inches square or equal cross-section area is announced by the Willey's Carbide Tool Co., 1340 W. Vernor Highway, Detroit 1, Mich. Bronze bearing trunnions support the tool rest table ¾ inch below the work cutter, thus permitting the grinding of tools from ¼ to ¾ inch square without further horizontal adjustment.

The Willey's Model 50-A Grinder is



Willey's Model 50-A Carbide Tool Grinder

equipped with a heavy duty, ball bearing, fully enclosed, ½ h. p., 3,450 r. p. m., reversible type motor with bearing take-up adjustment and designed for operation on 60-cycle, 3-phase current, 220/440 volts. The machine is controlled by a drum type reversing switch. Coolant equipment includes a direct drive pump and tank mounted in the side of the pedestal. Adjustable splash guards of special design enable the coolant to be concentrated directly on the point of the tool being ground.

tool being ground.

The 6 x 12-inch tool rest table of the grinder is made of accurately machined semi-steel and is graduated for accurately setting to correct angles 15 degrees above and 30 degrees below horizontal position. A keyway is provided for the accommodation of a protractor, tool guide, and dresser. Horizontal adjustment of the



HERE you need an ARMOURCLAD FIBRE COMBINATION DISC!

Faster-working Armour Abrasives Mean More Production

In the days ahead, competition will be keen. To get increased volume you'll need the fastest tools and the best abrasives possible.

For better, faster finishing there are specialized ARMOUR ABRA-SIVES designed to do a better job at less cost. The faster, sharper, coolercutting Armourclad Fibre Combination Disc is only one of Armour's complete line of better metal-working abrasives.

It will pay you to call on Armour's experienced technicians. They will gladly help you choose the abrasives and methods which do your jobs best.



ARMOUR Sandpaper WORKS

DIVISION OF ARMOUR AND COMPANY 1355 West 31st Street • Chicage 9, Illinois

June, 1946

MODERN MACHINE SHOP

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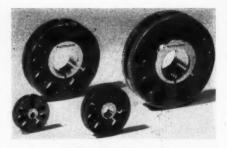
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tool rest table is controlled by means of a quick-acting and releasing clamp. A water pan is cast integrally with the base of the machine.

Standard equipment of the grinder as illustrated includes two 6-inch vitrified wheels, protractor, and diamond dresser. Specifications of the machine are as follows: surface feet of 6-inch diameter wheel, approximately 5,000 f. p. m.; height of spindle above floor, 42 inches; floor space, 19 x 30 inches; net weight, 400 lbs.; diamond dresser, % x 1½ inches; vitrified silicon carbide wheel size, 6 x 1½ x 2½ inches with steel back; diamond wheel size, 6 x ½ x 1½ inches.

Woodworth Adjustable Thread Ring Gage

An adjustable thread ring gage designed to provide for maximum accuracy together with long life is now being introduced by the N. A. Woodworth Co., 1300 E. Nine Mile Rd., Detroit 20, Mich., Said to maintain roundness through the maximum range of adjustment because of a design which distributes wear over 360 degrees or the full thread, the gage is adjusted along the helix angle of the



Woodworth Adjustable Thread Ring Gages

thread, thus preventing a jump lead at the adjusting slot of the gage.

Another feature of the gage is its light-weight, the outer body halves being made of aluminum alloy. For positive identi-entration, a green outer body is employed for "go" type gages and red for "not go" gages.

According to the manufacturer, the Woodworth Adjustable Thread Ring Gage cannot be thrown out of adjustment by ordinary blows or falls. The overall dimensions of the gage conform with conventional thread ring sizes.



Top Rim STEEL STACKING BOXES

18" x 12" x 6". 16 Ga. with Drop Handles—\$1.27 each

STANDARD SIZES

16 x 10 x 6.....18 Ga. 16 x 10 x 6.....16 Ga. 18 x 12 x 6.....16 Ga.

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WE MANUFACTURE ALL TYPES OF STEEL BOXES

We make a specialty of boxes made to fit your particular handling requirements. Special boxes designed so they can be run thru with standards enable us to quote prices comparable with that of a standard box.



183 CHARLES ST. PROVIDENCE, R. L.

EVERY OPERATOR QUICKLY LEARNS PRECISION TAPPING . . .

on a Procunier Tapping Machine . . .

Special design of the new Procunier Universal Tapping Machine makes it possible for the most inexperienced operator to learn accurate tapping in an amazingly short time.

Two long, compensating springs take all of the "guesswork" out of the tapping operation ... on both bottom and through tapping. Tap feeding and reversing pressures are preset and adjustable to the individual tapping job—entirely independent of the operator. These pressures remain constant, regardless of the pressure on the foot pedal. Dull or loaded taps are quickly spotted. Procunier low-cost tapping machines have many exclusive features. SEND COUPON for circular giving full details, specifications and prices.

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AUTOMATIC LUBRICATOR

The Procunier Automatic Piston
Type Lubricator supplies the
correct amount of lubricant to
the tap during the tapping
operation.

SEND FOR BULLETINS



Procunier Tru-Grip Tap Holder

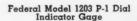
This tap holder drives the tap by the squared portion of the shank, keeps it in true by the round. The result is longer tap life, with no tap shanks "chewed" or damaged. Available with Procunier Tapping Heads and Tapping Machines.

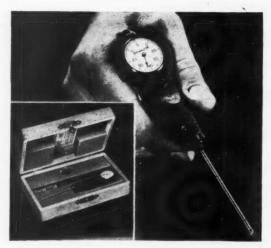
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Grip '	Tap H	olders		Univers	al '	Tap	ping
Machin	nes.						

Name

Address





Federal Model 1203 P-1 Dial Indicator Gage

A dial indicator gage for extremely small holes has been placed on the market by the Federal Products Corp., 1144 Eddy St., Providence, R. I. Designated as the Model 1203 P-1, the gage can be used in checking holes as small as 0.122 inch and up to 0.250 inch I. D., and is also designed to gage these small holes up to depths as great as 2¼ inches. Variations within the range of 0.122 inch up to 0.250 inch can be obtained by the use of a set of twelve interchangeable gaging plugs.

While unusually accurate and extremely sensitive to very fine dimensional variations, the Federal Model 1203 P-1 Dial Indicator Gage, according to the manufacturer, is also a sturd-

ily built instrument and does not require skilled manipulation or the fine sense of touch of the highly skilled inspector. The gage is calibrated and set for any specified I. D. to reveal the condition of holes up to a total range of plus or minus 0.004 inch. The minimum grad-

THE

258

"Jo-Set" RADIUS DRESSER

Saves Time--Gains Accuracy

\$99.50 FOB ERIE, PA.

Give your newest Apprentice ONE MINUTE and he will set the "Jo-Set!"

ONLY THREE SIMPLE STEPS TO SET-UP

- Set point of diamond to MOVABLE GAUGE. (Maintained accurate by centerof-axis MASTER GAUGE built into body casting).
- * For INTERNAL RADII rotate diamond under gauge so that only HIGHEST POINT CUTS.
- Set radius by inserting gauge block, or other sizing tool between stop and end of gib; lock and withdraw block.
- Set stops or remove them entirely, depending upon whether a partial or complete arc is desired.

"As Accurate As Your Gauge Blocks"



NO INDICATORS, MICROMETERS OR FEELERS NEEDED

DRESSES the wheel WHERE IT GRINDS.
RUGGED CONSTRUCTION—built to last
a life time—NO CHATTER.

SHAFT IN PERMANENT ALIGNMENT— Maintained by pressure bearing. Perfectly sealed against dust and dirt.

IMMEDIATE DELIVERIES — Write for circular or inquire of your dealer.

IAMES H. CROSS CO

Manufacturers' Representative

2765 W. 8th St., Erie, Pennsylvania

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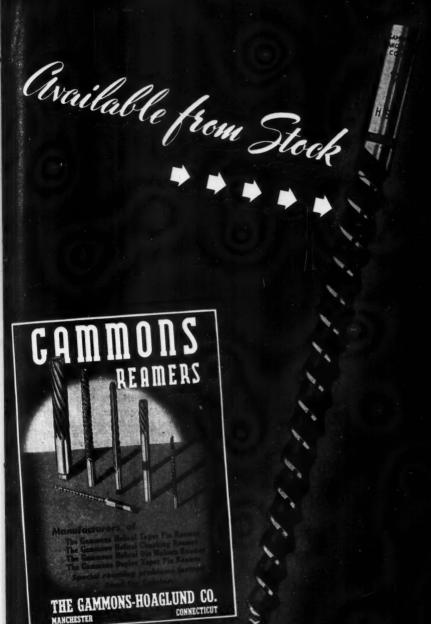
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ORIGINATORS OF THE HELICAL TAPER PIN REAMER

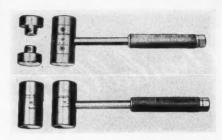
uation is 0.0001 nich. The dial is balanced and can be rotated. The sensitive contact of the gage is a hardened steel ball, and the reference contact is a chrome plated plug body. The gage is furnished with extra balls of the specified size to fit the

gaging plug.

Constructed to fit the hand conveniently, with the indicator dial in a fully visible position, the Model 1203 P-1 is regularly furnished for use as a single-purpose gage. If new dimensions call for additional plug sizes, such plugs can be readily adapted and calibrated to the instrument by the use of a micrometer caliper. Either a regular micrometer or an A. G. D. ring gage is used as a reference master for establishing and checking the zero setting. Two extra springs and a wrench are supplied with the gage, which is furnished complete in a strong, compact, velvet-lined wooden case.

Gregory "Perfect Balance" Soft Hammers

Two new models of soft hammers in the light sledge weight range have been added to the "Perfect Balance" line of



Gregory "Perfect Balance" Soft Hammers

hammers offered by the Gregory Tool & Manufacturing Co., 5300 Tireman Ave., Detroit 4, Mich. One model has a replaceable copper or brass head and the other replaceable brass or copper tips. Each model is available in head diameters of 1¾, 2, 2¼, and 2½ inches weighing from 4¾, to 10½ pounds.

Equipped with safety leather washer handles, the hammers are particularly designed for use in locomotive shops, for the assembly of heavy machinery in tool and die shops, and so on. The steel head on the removable tips model is case hardened to provide wear-resistance.

BOW MICROMETERS

INTERCHANGEABLE MANDREL TYPE COMPLETE SETS WITH MANDRELS AND STANDARDS IN CASES

When equipped with a set of 6 mandrels each Tubular Micrometer is in reality Six-Micrometers-in-One because each mandrel in the set of six is precision-fitted to the Micrometer with which it is furnished and is instantly accurate and ready for operation upon insertion in micrometer frame.



Will Not Rust or Tarnish:

Being made of special steel which is triple plated with copper, nickel and chromium making them rust resistant.

Cat. No.		Si	ze	Per Set	Cat. No.	S	ize	Per Set
M-06 M-09	2	to	9	inch \$25.50 inch 33.50 inch 39.50 inch 64.50	M-318 (Also available	to	24 se	inch

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with these **Features**

- Larger Capacity Tools up to 5" x 7" x 14"
- Uniform Muffle Tempera-
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- Removable terminal guards
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Centry



Sentry No. 5 Model Y Electric Furnace

Sentry Electric Furnaces with Sentry Diamond Block controlled atmosphere are clean, fast and economical. Produce uniform, scale-free, true-to-size work with no decarburization. Designed to operate in tool room or on the production line for hardening of molybdenum, tungsten and cobalt high speed

and high carbon, high chrome steels. Sizes and capacities to meet your requirements. Write for bulletin 1055-1E7.

The Sentry Company Sentry DIAMOND FOXBORO, MASS., U.S.A.

for Better Belt Joints

To keep belts in service longer, use only GEN-UINE Clipper Belt Hooks applied with Clipper Belt Lacers.

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Clipper Hooks are made of the finest quality wire— BETTER than ever before—produced for our exclusive use. Hooks hold with firm, sure grip — give longer satisfactory service.

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The Clipper No. 9 Portable
Lacer laces belts up to 6
inches wide in one quick,
easy operation. Under powerful pressure hook legs
are embedded flush with
the surface of the belt
and points clinched,
making a perfect joint.
Phone your mill supply
jobber for a demonstration!

CLIPPER BELT LACER COMPANY, Grand Rapids 2, Michigan, U.S.A.,



Keyn "Airflex" Spinner-Riveter

Especially adaptable for use in assembly work on such materials as plastics, fiber, canvas, and insulating materials, a spinner-riveter for all types of coldheaded assemblies, to be known as the Keyn "Airflex," is announced by The Plymouth Engineering Co., Plymouth, Ind. An outstanding feature of the unit is its adjustable spindle regulator for the



Keyn "Airflex" Spinner-Riveter

precise control or riveting force under maximum speed.

The machine utilizes a relatively narrow face tool which contacts only a fraction of the rivet at each blow. The tool is rotated while a pneumatic hammer strikes a series of rapid blows. Rotation of the tool spreads the peening over the entire surface of the rivet head. This rotating movement serves to adjust the force of the blows within that stress which the rivet body itself will withstand. Pressure is confined to the rivet itself and not on the parts being assembled.

The Keyn Airflex Spinner-Riveter is available with pistons from ½ to 1½

New Asial Relief GRINDING FIXTURE



TAKES
THE PLACE
OF COSTLY
SPECIAL DUTY
GRINDING
MACHINES

FIXTURE especially adapted to grinding cutting edges, steps, flutes and chip relief on milling cutters, burring tools, counterbores, countersinks, end mills, reamers, drills and taps.

All adjustments simple, visual and external. Instantly adjusted to right or left hand. Automatic indexing equalized at all turns. Can be used on surface grinders as well as cutter grinders. Performs most jobs with standard grinding wheels.

Send for literature explaining simplicity of operation and illustrating a number of typical applications.



GOVRO-NELSON CO.

1933 Antoinette Detroit 8, Mich.

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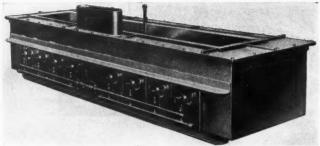
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inches in diameter for work up to ½ inch in diameter. The valve and regulating throttle are attached directly to the

body of the hammer, which is inter-

changeable over the entire range of sizes of rivets.

Champion "IH" Fire Tube Pot Furnace

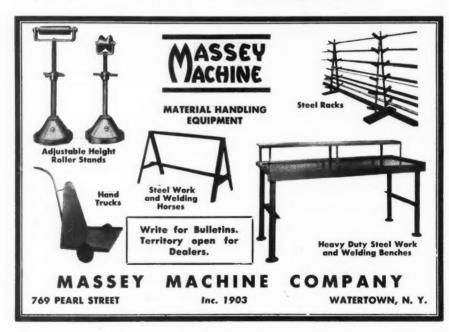
To meet the requirements for a pot furnace capable of holding a very narrow temperature control band, the Don C.

Champion "IH" Fire Tube Pot Furnace

Champion Laboratories, 9086 Alpine Ave., Detroit 4, Mich., announces Champion "IH" Fire Tube Pot Furnace, which is said to be particularly adaptable for oil or salt-draw furnaces, stereotype and linotype work, tinning,

babbiting, lead dipping and other operations up to 1,200 deg. Fahrenheit.

The Champion IH Pot Furnace is heated by burning a gas-air mixture in a fire tube submerged in the bath to be heated. The hot products of combustion envelop the exterior of the bath pot on their long way around to the exhaust port. According to the manufacturer, this principle assures very high (approximately 70 per cent) thermal efficiency which also contributes to cooler conditions in the area surrounding the pot. Installation of the unit consists merely of connecting to a gas line.



OPERATING TOOLS CAN MOVE FREELY OVER WORK HELD BY THESE CLAMPS

All these models assume a low, horizontal position. There are no obstructing handles to interfere with free movement of drills passing over clamped work. There is a size to meet every need.

MODEL KP 185 has solid bar.

MODEL KP 186 provides channel for positioning pressure spindle.

MODEL KP 831 and KP 835 are mighty midgets with incredible strength. Hold materials up to ¾". Both have channel bar to permit range of lateral spindle adjustment.

MODEL KP 830 has solid bar.





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The Champion IH Fire Tube Pot Furnace can be built in practically any size and shape so as to enable it to be adapted to the individual job.

Pyro Immersion Pyrometer

Especially designed for the non-ferrous industry and embodying numerous improvements which are said to enhance ruggedness, dependability, accuracy, and ease of operation, an immersion type pyrometer for use with instantly interchangeable thermocouples has been added to its line of Pyro pyrometers by The Pyrometer Instrument Co., 103 La-Fayette St., New York 13, N. Y. The design includes a large 4%-inch indicator with a 4-inch direct reading scale calibrated from 0 to 1,500 deg. F. or 0 to 2,500 deg. F. or equivalent Centigrade.

The Pyro Immersion Pyrometer is manufactured in two models with overall lengths of 27 and 43 inches and each having a specially designed swivel 8 inches from the connector block which permits the use of the pyrometer at any angle. The swivel is provided with toothed notches so as to prevent it from becoming loose during operation.



Pyro Immersion Pyrometer

The Pyro Immersion Pyrometer can be used with "bare metal" and "protected type" thermocouples, both being instantly interchangeable. The thermoelectric system is constructed with a permanent magnet, low resistance type galvanometer, and is enclosed in a shock, moisture, and dust-proof steel case which protects the system from possible demagnetization or interference from magnetic surroundings.

Motch & Merryweather No. 2 Metal Sawing Machine

Designed for cutting ferrous and nonferrous metal round, square, or multiple stock up to 6 inches and standard I-beams



PHILADELPHIA, PA Albert R. Dorn DElaware 3553

*Stack carried at these locations CCURATE BUSHING COMPANY, 440 North Ave., GARWOOD, N. J.

2-2415



Perhaps you are developing a product in which hardened and precision ground parts will be important. Your requirements may be simple or they may demand a high degree of accuracy . . . closely controlled hardening or carburizing . . . or an exceptionally fine surface finish such as on the part shown above. Meeting such requirements is daily routine at Allied.

Specifications for the part illustrated, as an example, called for the use of forged AMS-6250 steel, selective carburized and hardened. No decarburization was permitted on any surfaces which were to remain soft. Aircraft quality finish without trace of tool marks was required. The intricacy of the part presented unusual machining problems which were quickly overcome by Allied production ingenuity.

Whether your specifications are simple or complex you can be assured Allied's experience and skill will save you time and money. Send us your prints; we will submit quotations promptly.

ALLIED PRODUCTS ORPORATION

DEPARTMENT 6-A

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SPECIAL COLD FORGED PARTS . STANDARD CAP SCREWS . HARDENED AND PRECISION GROUND PARTS . SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST . JIGS . FIXTURES . STEAM-HEATED PLASTIC MOLDS . SPECIAL PRODUCTION TOOLS . R-B INTERCHANGEABLE PUNCHES AND DIES . DIE MAKERS' SUPPLIES

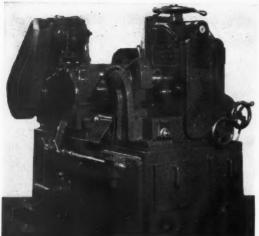
June, 1946

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MODERN MACHINE SHOP



up to 12 x 5 inches, a hydraulic feed and hydraulic clamping metal sawing ma-chine designated as the No. 2 is an-nounced by The Motch & Merryweather

Machinery Co., Penton Bldg., Cleveland

Motch & Merryweather No. 2 Metal Sawing Machine

13. Ohio. Features of the machine include positive clamping on either side of the saw blade; anti-friction headstock; singlelever control of feeding and clamping; positive clamping for multiple bars; and provision for fully automatic stock feed.

Specifications of the Motch & Merryweather No. 2 Metal Sawing Machine are as follows: saw blade diameter (maximum), 22 inches; number of saw blade speeds, 4; saw blade speeds (s. f. p. m.) 30-41-58-80; main drive motor, 5 h. p.; hydraulic motor, 2 h. p.; coolant pump motor, 1/8 h. p.; pulley

speed, 612 r. p. m., feeds (variable hydraulic), 0-15 inches per minute; saw blade bore, 3.149 inches; saw blade collar (diameter), 6.75 inches; floor space, 33 x 66 inches; weight (approximate), 5,500 pounds.

No Extra Construction Costs



ORDER

WORKBENCHES OF STEEL

AND SAVE

When you buy ready-made "Hallowell" Workbenches of Steel, instead of building benches of your own, you save the costs of designing, lumber and labor—which are plenty. "Hallowell" workbenches are built so sturdily that they withstand years of hard wear and give you longerthan-usual service! And don't worry about not getting the right style for special requirements ... "Hallowell" work-benches come in about 1300 ready-made styles with interchangeable drawer, cabinet and shelf units, and a variety of heights and widths.

Why not write today for the free "Hallowell" Catalog for further information? Or see your industrial distributor . . . for "Unbrako" and "Hallowell" products are sold entirely through distributors.

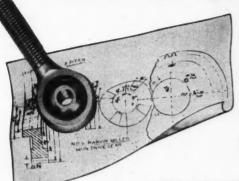
OVER 43 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PA. BOX 556 Boston • Chicago • Detroit • Indianapolis • St. Louis • San Francisco



Include in your plans





HEIM UNIBAL SPHERICAL BEARINGS AND ROD ENDS

Illustrated at right is the Heim Unibal Spherical Bearing Rod End.

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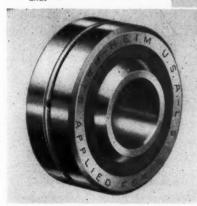
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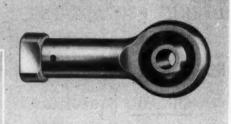
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The illustration above is the rugged Unibal Spherical Bearing.



Include the Heim Unibal Spherical Bearing or the Spherical Bearing Rod End in plans for your new products or in re-designing and improving existing products. This new type of bearing has many applications, and our Engineering Department is ready to assist you in suggesting changes which will reduce your costs and simplify your products. Consider these features — greater carrying capacity . . . large surface supporting area . . . maximum correction of misalignment in all directions . . greater radial and axial thrust loads are carried.

PLEASE WRITE FOR

THE HEIM



CATALOG NO. 11

COMPANY

June, 1946

946

MODERN MACHINE SHOP



NOTHING PROTE TS LIKE
Rawhide
AND THERE'S NOTHING LIKE
CHICAGO Rawhide

Cushioned power — that's rawhide. Hammers and mallets made from this tough, resilient material deliver the most power with the most protection. Your fine finishes, your expensive machined parts are much less likely to be damaged when you insist upon rawhide.

Your Guarantee

Here is why the best in rawhide is Chicago Rawhide: C/R's ultra-careful hide selection... special seasoning and manufacturing processes... 58 years' experience in working rawhide... top quality standards.





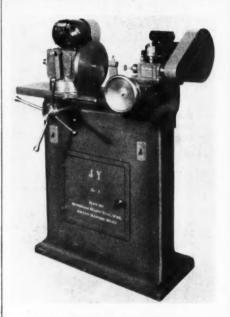
C/R coiled rawhide hammer faces may be quickly replaced in the permanent malleable iron heads.

CHICAGO Rawhide MFG.CO.

1207 ELSTON AVE. - CHICAGO 22, ILLINOIS

JY No. 2 Precision Internal Grinder

Designated as the JY No. 2, a high speed precision internal grinder with capacity for grinding radii and tapers on a wide variety of tool and die parts is announced by the Superior Machine & Tool Works, 528 Butterworth St., S. W., Grand Rapids, Mich. Especially designed to handle a wide range of toolroom work, grinding parts from ¼-inch in diameter and up with absolute precision, the machine is provided with spindle speeds of from 12,000 to 27,000 r. p. m. and work-



IY No. 2 Precision Internal Grinder

head speeds of 200 to 400 r. p. m. The spindle is mounted on preloaded super precision ball bearings to assure constant accuracy at even highest speeds.

stant accuracy at even highest speeds. The JY No. 2 Precision Internal Grinder, which occupies a floor space of 36 x 68 inches, has a capacity for swinging work up to 10½ inches and is provided with a 11-inch longitudinal travel. A 10½-inch faceplate with heater controlled switches is standard equipment of the machine, which, it is claimed, does not have to be stopped in order to measure the work. A friction drive clutch and lever are used to put the machine out of gear and apply brakes.





- Smooth, fast, accurate control of load.
- Finger-tip control.
- Light weight Cannot be overloaded.
- Capacities up to 10 tons.

Find out how Curtis Air Hoists, Air Cylinders and Air Compressors can save man-hours, cut costs in your plant. Write for bulletin C-7.

92 Nears of Successful	CURTIS PNEUMATIC MACHINERY DIVISION of Curtis Manufacturing Company 1913 Kienlen Avenue, St. Louis 20, Missouri Please send me Form C-7 on Curtis Air Hoists and Air Cylinders; also Curtis Air Compressors.
- mufact	Name
Mon	Firm
	Street
H-490	City

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The grinding spindle is driven by a ½ h. p. 2,450 r. p. m. motor, and the work spindle by a 1/6 h. p. 1,110 r. p. m. motor. Both motors are dustproof and fully enclosed.

Meeker Live Center

Manufactured in sizes up to and including No. 7 Morse taper and equipped with precision Timken tapered roller



Meeker Live Center

bearings provided with means of adjustment, a live center employing a steep angle bearing to absorb heavy thrust loads in combination with a bearing of heavy radial load capacity is now being produced by the Meeker Manufacturing Co., 894 E. 149th St., Cleveland 10, Ohio. The Meeker Live Center can be sup-

plied with any number of interchange-able hardened and ground tool steel points having an angular seat in the bearing housing and is available with any standard or special taper shank or with a straight shank.

Logan "Air-Draulic" Cylinder

Fast-acting economical operation by air is combined with smooth, uniform. controlled hydraulic-type regulation in the Logan "Air-Draulic" Cylinder now being marketed by the Logansport Ma-chine Co., Inc., 901 Center Ave., Logans-port, Ind. Basically, the double-acting non-rotating Air-Draulic is an air cylinder and may be utilized wherever compressed air is available, yet is said to provide the smooth, accurately controlled feed regulation which is normally obtained in a hydraulic cylinder.

The Logan Air-Draulic Cylinder is made with separate air and hydraulic pistons assembled as an integral unit on a common piston rod. Rod movements are powered by the air cylinder, which

Rod Grind

STRAIGHT RODS

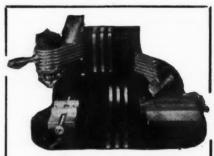
1/32" to 1/2" Diameter Diam. Tol. .0005" on Rods Up to 6' Long. Diam. Tol. .001" on Rods Up to 12' Long.

> **Quick Delivery High Quality**

14 YEARS OF COMPLETE CENTERLESS SERVICE

COMMERCIAL GRINDING

6605 Cedar Ave., Phone: EN 3412, CLEVELAND 3, 0

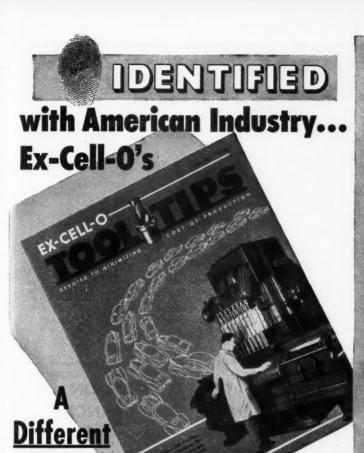


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1776 Breadway, New York, N. Y.



Industrial Magazine

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Standard and Special Multiple Way-Type Precision Boring Machines

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may be controlled by any type of 4-way air valve. As the piston rod with its two pistons is moved, oil flows between the chambers of the hydraulic cylinder which are connected externally in a self-contained circuit. An adjustable built-in speel control valve in this circuit serves to regulate the flow of oil and thus the speed of the piston rod movement. No hydraulic power unit is required.

The Logan Air-Draulic Cylinder can be furnished for controlled feed with rapid return in either direction. This is accomplished by means of a ball check valve built into the hydraulic piston. The cylinder can also be furnished for controlled feed in both directions. Skip feed movements can be provided through cam valves in the hydraulic circuit.

The Air-Draulic can be obtained with five standard types of mounting-foot,

clevis, center-line, rod-end flange, and blind-end flange. Combination mountings utilizing one of these types at the blind end of the cylinder and another type at the rod end can also be furnished. The cylinder is available in four standard

is available in four standard sizes from 3 to 8-inch bore, with any length of stroke up to 5 feet. The air piston is built for operation at pressures up to 150 lbs. per square inch.

The air and hydraulic units of the Logan Air-Draulic Cylinder are entirely separate, having no connection other than the piston rod. No tie rods are required on the hydraulic cylinder, and the end cover is attached by means of cap screws. Alternate air bleeders are provided.

The air cylinder is a brass-lined steel tubing and incorporates molded composition packings which are self-adjusted by air. Large air inlets assure rapid response of the cylinder.

Leakproof, vibrationproof Logan "Collet Grip" steel tube fittings are employed in the hydraulic circuit of the Air-Draulic Cylinder.



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Maintain That Width With the "CHATTERLESS FLOWING ACTION" of a Curved Tooth Overlapping Side Milling Cutter.

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Place instrument in spindle of boring mill (vertical or herizontal), drill press or jig borer.

FAST

200 - 1000 r. p. m. Bring thumb nail to bear against centering bead until it runs true. Stop machine and focus on work. Keep eye at least 4 inches from viewing aperture.

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Locate cross lines on work to match lines in viewing aperture.

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For accurate, uniform, speedy finishing of metal & plastic parts.



VARIABLE SPEED LATHES

Available in chuck and collet styles, with a wide range of spindle speeds—from a low of 400 RPM to a maximum of 4800 RPM, in a ratio of 6 to 1 with single speed motor, or 12 to 1 with two-speed motor.

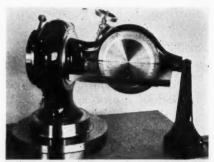
Write for Catalog 440

SCHAUER MACHINE

ORIGINATORS OF TODAY'S SPEED LATHES

Studler Model "G" Angle Computer

The Studier Model "G" Angle Computer illustrated herewith, product of The Angle Computer Co., 1709 Standard Ave., Glendale 1, Calif., can be used for the layout and inspection of tools, dies, jigs, fixtures, castings, patterns, forgings, and other work to be laid out or inspected which may include angles and compound angles. With the device, only one setup of the work is said to be re-





Front and Rear Views of Studler Model "G"
Angle Computer

quired in most instances since the surface plate may be rotated 360 degrees in each of three separate directions of rotation; namely, horizontally, vertically, and radially. The operator simply clamps the work to the surface plate, which can be moved to a near desired position. Then, with the aid of the actuating mechanism of the unit, the operator can quickly and easily find the exact position to one ten thousandth of an inch or to the minute of a degree, it is claimed.

Specifications of the Studler Model G Angle Computer are as follows: surface plate, 9 x 16 inches; diameter of horizon-

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For Finer, All-In-One BURRING, FINISHING, POLISHING At Lower Cost

See how YOUR OPERATIONS between the grind and the buff CAN BE REDUCED TO ONE with Brightboy. DISCOVER the possibilities which Brightboy offers for cleaning and polishing action of its soft rubber binder, which works simultaneously with the abrasive. ASK US about Brightboy work savings. Get Brightboy prices and new catalog from your dealer.

BRIGHTBOY INDUSTRIAL DIVISION
Weldon Roberts Rubber Co.
Newark 7, N. J.





tal protractor, 9½ inches; diameter of vertical protractor, 9½ inches; diameter of radial protractor, 10 inches; readings, one minute; base casting diameter, 18 inches; height, 21 inches; length, 32 inches; weight, approximately 530 lbs.

Operated on Gray Non-Metallic Ways, the planer table illustrated herewith has been in continuous service day and night for over two years.

Gray Non-Metallic Table Way

Designed to eliminate cutting, scoring, and undue wearing of machine tool ways, the non-metallic table way announced by The G. A. Gray Co., Cincinnati, Ohio, consists of laminated plastic plates which are fastened to the table by laminated plastic pins. The laminations of both the plates and the pins are at right angles to the bearing surfaces—of great importance where maximum non-scoring and wear-resisting qualities are desired.

In addition to the non-scoring and wear-resisting qualities, the laminated plastic used in the construction of the Gray Non-Metallic Table Way is claimed to afford an additional advantage when used in connection with high speed re-

WHITNEY- JENSEN PRODUCTS

Nos. 10 - 11 - 12

BALL BEARING PUNCHES

Capacity-3/8" thru 1/4"

The ball bearing screw principle gives tremendous punching power in a light-weight tool.



No. 24 BALL BEARING PUNCH

Capacity—½" thru ¾"

Depth of Throat—3½"

Weight—50 lbs.

Height of Throat-4"

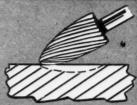
Write for Catalog WHITNEY METAL TOOL COMPANY

The Right BUR for the Job

Shape "R"

TREE

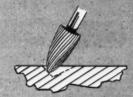
for removing flaws and blending casting surfaces



Blending operation with the heavier section.

Shape "R" is available in base diameters of "", "", "", "", ", ", fine, medium or coarse cut.

Pratt & Whitney KELLER Burs are specialized Burs, designed for specific jobs where clean, smooth work is necessary. Yet KELLER Burs like Shape "R" are designed for diversity as well. Shape "R" removes flaws and sand holes from castings with its pointed end, then blends the area with its heavier section. And the point is used in many instances to determine the depth of the sand hole. Pratt & Whitney KELLER Burs are ground from the solid, by machine, for longer-lasting smooth operation. Write for full information on the wide variety of P&W KELLER Burs.



Pointed end removing a sand hole from a casting.



PRATT & WHITNEY

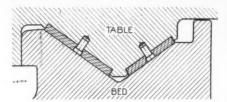
Division NILES-BEMENT-POND COMPANY KELLERFLEX SALES DEPARTMENT

WEST HARTFORD 1, CONN.

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This cross-sectional drawing shows the manner in which Gray Non-Metallic Table Way is installed.

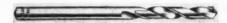
ciprocating members where the bearing surfaces may be subjected to heavy pressures; namely, high heat insulating qualities which are said to be of particular value where planer tables are involved since, without some form of heat insulation, even a slight temperature rise generated at the V-bearing surfaces is transmitted to the lower plate of the box section table, thereby causing it to expand and curl up at the ends. This curling not only tends to destroy the accuracy of the planer work, but also permits dirt to get under the table vees and increases danger of cutting and scoring.

Due to the heat-insulating qualities of

the laminated plates, practically no heat is transmitted to the metal table, it is claimed. As the result, the tables of Gray planers with non-metallic ways can be operated at any feasible speed without danger of the tables curling up at the ends, the manufacturer states.

Chicago-Latrobe Stub Screw Machine Drill

Specifically designed for screw machine operations requiring short, sturdy drills, the stub screw machine drill now being marketed by the Chicago-Latrobe Twist



Chicago-Latrobe Stub Screw Machine Drill

Drill Works, 411 W. Ontario St., Chicago 10, Ill., is available in wire gauges from Nos. 1 to 60, letter sizes A to Z, and fractional sizes from $\frac{1}{12}$ to 2 inches.

The drill is made with short flutes and subjected to the proper heat treatment to assure maximum tool life between grinds.

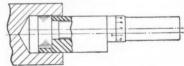
NEW INDICATOR PRECISION GAGING of INSIDE DIAMETERS WITHOUT USE of BULKY, DELICATE INDICATORS . . . The COMAL Gage



PATENT PENDING

Less-skilled operators now can expertly gage inside diameters on the machine during production, or on final inspection—without "feeling" or "rocking." The COMAL Gage definitely eliminates guessing, bulky, slow and time-wasting methods.

FAST, SIMPLE, ACCURATE—Constant rise radius part contacts high and low points of inside bore diameters. Rotation of knurled handle gives calibrated readings instantly to indicate over or undersize, out-of-round or taper conditions (example: .001 variation of work diameter records ¼" calibration. Half, three-quarter inch or wider calibration for .001 variation can be had for closer reading.)



COMPARE THESE FEATURES — Indicator precision—low cost—sturdier construction — faster — simpler — foolproof — compact — lighter — easier to handle — no accessories.

SPECIFICATIONS—Available in sizes from ½" diameter up. Made for deep or shallow holes. Calibrated in thousandths—parts of thousandths—or "tenths."

WRITE TODAY FOR QUOTATION giving bore diameter, depth, and calibrated reading desired.

PROTECTED SALES TERRITORIES AVAILABLE.

THE COMAL GAGE & MACHINE CO., 2819 Jay Ave., Cleveland 13, Ohio



LOOK! AN EJECTOR TYPE TOOL BIT WITH LONG SOLID CARBIDE INSERT!

Get long tool life and low production costs with this new Super Tool. No outside tip holding mechanism—no interference with chip flow or assembly in tool block. No brazing strain, as carbide tip is held entirely by mechanical means.

A heavy section of well supported Carbide allows heavy cuts without cracking.

Whatever Your Cutting Job, Look First to SUPER

Carbide tipped tools for Turning, Facing, Reaming, Milling, Forming, Spot Facing, Boring, Grooving, Grinder Rests, Wear Parts, Counterboring, Shaving, Centers, etc. You get double tool life . . . the compound angles used permit light regrinding cuts on top, side and end, which produce a new sharp cutting edge with minimum loss of Carbide.

The Super Ejector Type Tool Bit works like an ejector lead pencil . . . the Carbide is mechanically held. Each holder can be used for any material. Long Solid Carbide replaceable bits, ground for any specific purpose, are available in suitable grades.

TUPER TOOL TOMPHNY

Carbide Tipped Tools

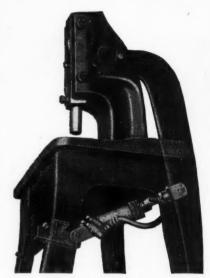
21650 Hoover Rd., Detroit 13, Mich. 4105 San Fernando Rd., Glendale 4, Cal.



As the result of its design, it can also be efficiently used in hand drills and breast drills.

National Pneumatic Operating Equipment for Kick Presses

The National Pneumatic Co., 420 Lexington Ave., New York 17, N. Y., has designed a "packaged" pneumatic equipment unit (Kit DC-39950) which, when installed on any kick press, converts the



National Pneumatic Operating Equipment Installed on Kick Press

press to power operation. The kit, or unit, is comprised of the following component parts which may be readily applied by practically any mechanic: (a) air engine of 270 lb. rated power, delivered at 100 lb. air pressure—this engine to be mounted on a pivot type bracket and attached to kick press lever; (b) foot-operated control valve piped to (c) two flexible hose connectors; (d) speed adjusting fitting to control the speed of engine stroke in both directions; (e) cutoff cock for shutting off air to the unit; and (f) air strainer to be placed in the air supply line leading to the control valve.

If desired, two hand-operated control

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The Wade Tool Co. 54 RIVER ST. WALTHAM 54, MASS.

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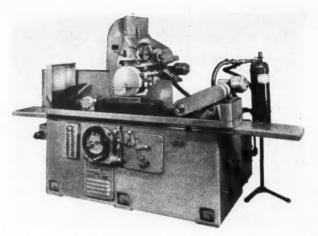
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Thompson Type B Tru-form Grinder equipped with two master crushing rolle

Thompson Improved Truform Grinder

The Thompson Grinder Co., Inc., Springfield, Ohio, announces that its Truform Grinders are now each available with two master crushing rolls for speed-

ing the production of precision flat form contours. One roll, the "work roll," is used for the initial crushing and truing. The second or "reference roll," spindle mounted on the opposite end of the table, is used for touching up the wheel and correcting form loss.

valves may be substituted for the foot control valve as an additional safety factor. With the hand-operated valves the press operator must employ both hands, thereby eliminating the possibility of tripping the press while the hands are in an unsafe position.

MASTERDRIVES for PLANERS



Eliminates Lineshafting

Now you can have added flexibility in plant layout, because Masterdrive eliminates lineshafting and permits placing planers wherever you wish.

The drive is supported by four supports. Each of these require the drilling and tapping of four holes. Once supports and horizontal bars are in place, motor base and outboard bearing support can be moved laterally to line up with pulleys. Your present ceiling lineshaft pulleys are used on the motor counter shaft.

A single complete installation with Masterdrive - one responsibility. Write today for details of planer or other Masterdrive applications.



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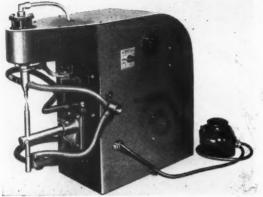
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The grinding wheel, which has been touched up on the reference roll, is run at grinding speed against the work roll, thus reprocessing it directly on the ma-

touched up on the reference roll, is run at grinding speed against the work roll, thus reprocessing it directly on the machine without disturbing the setup or the removal of any part of the machine. In this manner, the work roll can be reground whenever it loses form and can be used for hundreds of additional dressings

or until worn out. Duplicate master rolls can be ground in the same manner before production is started.

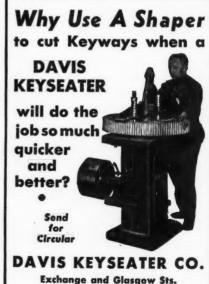
Weldex Model 263-A Spot Welder

Recommended for spot welding metals up to 18 gauge C.R. S. or equivalent, an improved bench type spot welder designated as the Model 263-A is an-

nounced by Welden inc., 7327 McDonald Ave., Detroit 10, Michigan.

A 3 kva, 220-volt, 60-cycle, single-phase, air-operated, foot-controlled type with adjustable pressure switch, the machine measures 21 inches high x 19 inches wide x 23 inches deep, has a streamline body, air dry enamel finish, and weighs approximately 135 lbs. when ready to ship.





ROCHESTER, N. Y.

BENDS PIPE EASILY and QUICKLY INTO ALL SHAPES

" American"

Cold Pipe. Conduit and Tube Bending Machines

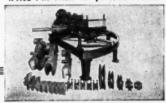
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Solid, "non-sparkling, non-magnetic alloy head," threaded at both ends.

Threaded plastic tips can be screwed in by hand. Oval hole drilled in hammer head prevents handle from coming off or turning.

When buying mallets be sure to buy SOUTHWEST and get the original.

Send \$1.00 and name of your nearest dealer, for prepaid sample mallet.

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No. 0 41/2-TON CAPACITY Write for Details.

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Optional Features for Cooley Muffle Type Electric Furnace

Two optional features are announced for the muffle type electric furnace for heat-treating operations manufactured by the Cooley Electric Manufacturing Corp., Indianapolis, Ind. The standard furnace is manufactured with a hinged door which, when opened, forms a loading shelf. It is now offered in an alternate design incorporating a counterweighted vertically operated door for par-



Cooley Muffle Type Electric Furnace with Optional Features

ticular use where only partial door opening to the furnace is required.

The second optional feature is a heavy gauge structural steel stand of welded construction which serves as a bench for the furnace, providing a shelf for storage space beneath the ample table top area. This stand has been found to be particularly desirable due to the fact that it establishes the furnace at the proper working height with the hearth 42 inches above the floor.

The Cooley Muffle Type Electric Furnace is simply constructed. The outer shell is of heavy gauge sheet steel, well insulated and with cast iron end frames.

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against one Chuck you are using for STRENGTH

Every Westcott part is built stronger than it has to be. We could make the body lighter, the jaws thinner, other parts less rugged. And the chuck would still be strong enough for all your needs—maybe. But there will never be any "maybe" about a Westcott. When a chuck quits, production quits. That's why we say—Test a Westcott.

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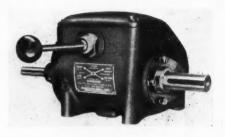
Elements are of the embedded type which afford protection to the element wire from atmospheric attack. Interlocking, rectangular elements form the interior of the chamber, with heating element replacement being a simple procedure. The heating element arrangement coupled with the design of the furnace maintains the chamber temperature even throughout so that there are no cold spots, it is claimed. The furnace may be obtained with either the new vertically operating door or the bottom hinged door.

Western 9000 B Series

Especially adapted to flat plate or platform mounting, a transmission designated as the 9000 B Series is announced by the Western Manufacturing Co., 3400 Scotten Ave., Detroit 10, Mich. The case is provided with four bosses which are drilled and tapped so that the transmission can be fastened to a plate or flat portion of the machine on which it is to be installed.

The Western 9000 B Series Transmission is of 5 h. p. capacity with input

speed of 900 r. p. m. and four gear changes available through one automotive type shift lever. Ratios obtainable



Western 9000 B Series Transmission installed on special machine for winding coils

are 1 to 1, 2 to 1, 3 to 1, and 4 to 1. Special ratios can be provided when necessary.

All gears and shafts of the transmission are of heat-treated alloy steel, with the gears being lapped. All revolving shafts are mounted on anti-friction bearings, and the case is oil sealed.



How do YOU measure manpower?

Does manpower in your welding department mean numbers of men—or do you, more logically, measure manpower in terms of production?

Because welding is becoming increasingly important in every phase of production today, it is important that your welding be done faster, better and more economically. If weldors are using cranes or spending time propping up, turning over and flopping their weldments, they are interrupting production and increasing costs on every foot of welding.

Investigate the demonstrated advantages of C-F Hand or Power-operated welding Positioners and see how they can help your weldors produce better, faster and more economical welding. Weldors can swing weldments into any position because every weld is downhand, larger electrodes can be used with resulting savings in time and material. For production welding, C-F Power-operated Positioners are unequalled—equipped with either variable or constant speed table rotation and power tilt, C-F

Positioners have been setting new standard in production welding in many varied industries. Write for Bulletin WP-22 and more details. Cullen-Friestedt Co., 1311 S. Kilbourn Ave., Chicago 23, III.

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.



positioned welds mean better more economical welds

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PATENT ADJUSTABLE HOLLOW MILLING TOOL

Quickly and easily adjusted — rugged in construction—rigidly locked when on the job.

Carbide tipped blades optional, are quickly interchanged with the high speed steel blades, for cutting the harder or gritty materials.

The Rogers 61 years experience in Special Tool Design is always available to your firm.

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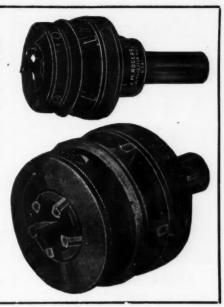
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New Jersey



FOR THE TOUGHEST TAPPING AND REAMING JOBS!

The finest of tolerances in tapping and reaming are easy to maintain if you use a Ziegler Floating Holder to compensate for the inaccuracies in spindle alignment that frequently occur in setting up the work.

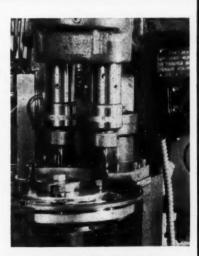
This is because the Ziegler automatically overcomes such misalignment troubles even though they may amount to as much as 1/32" on the radius, or 1/16" on the diameter.

The Ziegler thus greatly reduces set-up time, making it unnecessary to have the set-up as accurate as required when ordinary holders are used. And, at the same time, it practically eliminates rejects. Try it and see! Catalog sent on request.

W. M. Ziegler Tool Co.

1924 Twelfth St., Detroit 16, Mich.





Ziegler Floating Tap Holder installed on Kaufman Tapping Machine. (Photo courtesy Kaufman Mig. Co.

Lassy TAPPER*

AND THREADER (Single Spindle) Saves Time, Taps, Expensive Labor

Taps twice as many holes, quicker than with a tap wrench. Always right angle holes. Tap capacity 1/6" thru 1".



STEPPED HOLDING BARS. Replace Vise, hold work firmly prevent tap-breaking torque.

TAP ADAPTERS. No extra spindles needed. Change taps in a jiffy.

DEPTH GAUGE. Always shows depth tap has traveled.

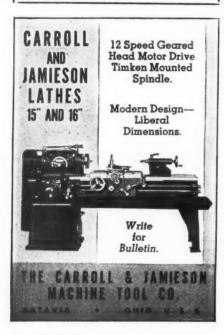
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Immediate Delivery

LASSY TOOL COMPANY

PLAINVILLE, CONN.

*Patents Pending



Mead Pneumatic Column Press

Particularly useful for small to medium runs where it is desirable to leave fixtures permanently mounted to bases, an air-operated column press which is designed to deliver a ram pressure of 300 lb. or 110-lb. line pressure is announced by the Mead Specialties Co., 4120 N. Knox Ave., Chicago 41, Ill. With the pressuccessive operations may be quickly performed by swinging the ram over the desired fixture, raising or lowering it to the correct height by means of a screw, and locking it in place with two drawbolts. In some cases, a dozen or more



Mead Pneumatic Column Press

small fixtures may be left permanently set up ready for immediate use when needed, the manufacturer states.

For many jobs involving the cold forming of metal, the small squeeze of the press is claimed to be unusually satisfactory because of the minimum tendency to fracture the metal. The same is said to be true with respect to the hot forming of plastics, as well as in many assembly jobs involving press fits.

Specifications of the Mead Pneumatic Column Press are as follows: height overall (excluding handle), 24% inches; diameter of table, 23½ inches; net weight of press, 285 lbs; stroke, 3 inches; power factor, 28 times line pressure; maximum



Gratified business-machine manufacturers made this report after gaging over 82,340 "slots" with FONDA LIFETIME-CARBIDE gage blocks: not one block showed the slightest wear or impairment of accuracy!

Over 82.340 slots gaged — and still no gage block wear

Formerly, on a job of this scope, these manufacturers would have expended some 100 steel gage blocks for each LIFETIME-CARBIDE block now emplayed. They were also able to position and solder the "counters" in the castings, without affecting the corrosion- and acid-proof LIFETIME-CARBIDE blocks. You make a lifetime investment in fine-precision accuracy when you obtain your 82-piece or 35-piece set of FONDA LIFETIME-CARBIDE Gage Blocks (Standard individual sizes from .050" to 4.000" also special sizes). No worn gage blocks to recalibrate or replace thereafter! Costly work rejects are cut to a new low.

Industry can now profit thru controlled accuracy . . . from work layout and machine set-up, thru manufacturing — to finished product and inspection.

Write for the facts about LIFETIME-CARBIDE Gage Blocks

FONDA GAGE COMPANY

53 DALY STREET, STAMFORD, CONN.

Agents in all principal cities throughout the world

FONDA Gage Blocks

CARBIDE OR STEEL (PATENTS PENDING)

PASSED HIGHEST TESTS DEVISED BY THE NATIONAL BUREAU OF STANDARDS

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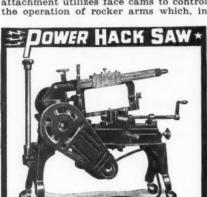
June, 1946

MODERN MACHINE SHOP

clearance of ram above table, 11 inches; maximum depth of throat, 4% inches.

"Dunamatic" Lathe Attachment

Designed to provide an economic and accurate means for producing small parts automatically, a lathe attachment for installation on either Atlas or Logan lathes, to be known as the "Dunamatic," is announced by the Dunn Engineering Co., 6341 Lyndon Ave., Detroit 21, Mich. The attachment utilizes face cams to control the operation of rocker arms which, in

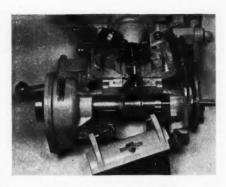


Portable

Low Priced Self-Contained Sturdy

Ready to Work-Economical EXPORT DEPT.

1111 SO. FERRY BLD'G. NEW YORK 4, N.Y. Write for Bulletin No. 300



"Dunamatic" Lathe Attachment

turn, control the operation of form and/or cut-off tools attached to them. Either circular or flat form tools or a combination of both may be used, the selection of type depending upon the size of the production run. The rocker arms operate on pivots which are precision ground and properly hardened so as to reduce wear to a minimum and thus eliminate the necessity for frequent adjustment of the rocker arms.

In the operation of the Dunamatic Lathe Attachment, the stock is cam fed through a tube by feed fingers into a collet automatically, and a moving stock stop determines the length of the part to be formed and/or cut off. Closing of the collet, which is also an automatic operation, is timed to coincide with the start of operation of the work tools.

According to the manufacturer, the Dunamatic Lathe Attachment is complete and can be attached to a lathe without the necessity for drilling holes or any other machining operations within 1 to 2 hours' time. Moreover, its removal can be readily effected so as to enable the



EXPANDING MANDRELS

Any size hole within a 1" range of infinite variation! That's what one size Champion Expanding Mandrel will completely and accurately handle. The hardened steel flexible sleeve automatically expands to the correct size as it is raised on the tapered arbor. Only 12 Champions needed for range from 1/2" to 61/2". Eliminates numerous solid mandrel sizes. More convenient. Proved for years by thousands of shops. COSTS 2/2 LESS

WESTERN Tool and Manufacturing Co.Inc

Mow Air Guns Air-O-chek Air Guns Air-O-chek Air Guns Air-O-chek Air Guns With Ferrules Screw-On Ferrules

Patented ball and sock connection between internal lever and the valve.

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Double Grip
Inside of hose held by
threaded shank—outside held
by serrated ferrule,

Precision machined from bar brass and stainless steel.



Easy to Install

Just trim hose square. Slip ferrule over the end, insert Air-O-Chek and screw up.

Made to fit 1/4", 5/16" and 3/8" one- and two-braid air hose. In ordering specify exact inside and outside diameter of hose.

In machine shops, factories and foundries—wherever compressed air is used for blowing chips, grit, etc.—AIR-O'CHEK Air Guns have set new standards of leakproof dependability, ease of use and low maintenance cost.

Now AIR-O-CHEKS offer the advantage of convenient assembly direct to the hose without special tools. You just slip the new Screw-On Ferrule over the hose, insert the AIR-O-CHEK shank and screw up. The assembly is streamlined—free from protruding clamps or screws. No costly equipment used in contracting or expanding ferrules is required. You can attach the AIR-O-CHEK on the job using only wrenches.

Order a sample or send for literature today.

AIR-WAY PUMP & EQUIPMENT CO., 403 S. Jefferson St., Chicago 7

lathe to be quicky restored to normal service. Power for operation of the attachment is taken from the standard lathe lead screw and transmitted, by means of a roller chain and steel sprockets, through a steel worm and bronze worm gear, thus providing for efficient as well as quiet operation, it is claimed.

Fonda Lifetime-Carbide Gage Block Set

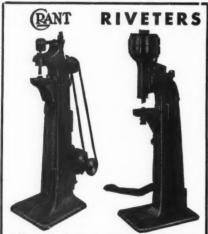
Introduction of a complete 82-piece set of lifetime-carbide gage blocks is announced by the Fonda Gage Co., Stamford. Conn. The blocks are made of high grade carbide which is claimed to be extremely abrasion resistant and specially treated to prevent chipping and cracking, and are provided with a surface finish of from 0.15 to 0.30 r. m. s.

According to the manufacturer, the Fonda Lifetime-Carbide Gage Blocks can be wrung dry and absolutely clean. Withstanding excessive vibration without becoming separated, they can be readily used at the machine. No protective coatings are necessary, since the blocks are



Fonda Lifetime-Carbide Gage Block Set

corrosion and acid resistant, it is claimed. The Fonda Lifetime-Carbide Block Set comprises blocks ranging in size from 0.050 to 4.000 inches, including a 0.10005-inch block which makes possible sizes of one-half of one ten-thousandth of an inch, with 480,000 possible combinations. All blocks up to 1 inch are solid



 Pioneers in the riveting field. Head rivets from smallest to 3/8" diameter, either by noiseless spinsmallers to year.

ning or vibrating hammer method.—Sizes to meet
all needs.—Types include Vertical and Horizontal
Multiple Spindles. Write for literature—and don't forget to send samples.

96 Silliman Ave.

296

THE GRANT MFG. & MACHINE CO. Bridgeport 5, Conn



The only hand grinder with spindle speed of 100,000 R.P.M. on 100 pounds air pressure. It has revolutionized hand grinder performance. Can be directed in any working position; operates with extreme ease. Steel construction throughout. Formed to fit the hand. Weighs only 14 ounces. Prompt delivery

Representatives in Principal Cities

130-134 E. LARNED ST. DETROIT 26, MICHIGAN

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LEAD SCREW TAPPING...

ON YOUR OWN DRILL PRESS!



Precision ground lead screw provides accu-rate, controlled tap-ping from 0-80 to 7/8".

With this ROTOREX tapping head you can convert your drill press to a precision tapping machine in a matter of minutes, and consistently produce Class III threads. To change to drilling, simply swing the ROTOREX to one side.

Employing the same principle as expensive tapping machines, the ROTOREX uses a precision ground lead screw for positive, automatic control of tapping leads and operates on a complete automatic cycle. It is rugged in construction, economical and can be operated with unskilled labor.

CHECK THESE FEATURES.

- 1. Positive, automatic control of lead.
- 2. Hardened, precision ground lead screws.
- 3. Instantaneous emergency reverse.
- 4. Complete automatic cycle.
- 5. Accurate control of depth-accuracy to .010.
- 6. Foot control frees operator's hand for loading.
- 7. Capacity 0-80 to %".
- 8. Price complete, \$175.00, F. O. B. factory.

\$17500

MACHINERY CO., INC.,



142 BROADWAY, NEW YORK 7, N. Y.

June, 1946

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1946

MODERN MACHINE SHOP

carbide; 2, 3, and 4-inch blocks are carbide tipped. The set, as well as individual blocks, is manufactured in three grades: "AA" (± 0.000002 inch), "A" (± 0.000004 inch), and "B" (± 0.000008).

Baldor No. 62 Capacitor Type Grinder

Designated as the No. 62, a ¼ h.p. grinder powered by means of a capacitor type motor which, it is claimed, will not burn out even though repeatedly over-

REQUEST NEW ILLUSTRATED
BULLETIN 41
6", 9" and
12" JAWS
Sold plain
or with
jig
attachments

"Vise of a thousand uses" as jig, fixture on many types of machines. Sizes up to 124 lbs. Various attachments permit accurate positioning of regular and odd shapes.

GRAHAM MULTI-PURPOSE VISE KNURL HOLDER FITTING LATHE TURRET



"Adjust - angle" teature cuts many patterns all from Straight Knurls, on work up to 21/2" dia. Shank to fit your turret.

Request New Illustrated "Bulletin 41"

GRAHAM MFG. CO.

31 BRIDGE ST. EAST GREENWICH, R. I.

loaded is announced by the Baldor Electric Co., 4351 Duncan Ave., St. Louis 10, Mo. Constructed for operation on single-phase 60-cycle current, 110 volts, at a maximum speed of 3,440 r.p.m., the grinder includes tapered end bells providing wide clearance between the wheels and the motor frame, and is equipped with 6-inch diameter x %-inch wide grinding wheels.

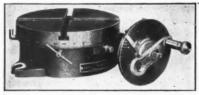


Baldor No. 62 Capacitor Type Grinder

In addition, the design of the Baldor No. 62 Capacitor Type Grinder includes a cast iron base and adjustable tool rest. Described as ideally suited for gages, repair shops, maintenance departments, and so on, the grinder can also be used with wire or cotton brushes since wheel guards are readily removable. The net weight of the machine is 36 pounds.

Huppert "Hi-Temp" Furnace

Known as the "Hi-Temp" a high temperature furnace especially designed to meet the need for a small capacity unit for the precision treating of high speed



71/2 in. Rotary Table for Small Miller

Send for circular.

STEVENS ROTARY TABLE

Table graduated for single degree reading. Worm can be disengaged for turning table by hand.

Other sizes 12", 18" and 24" diameters.

JOHN B. STEVENS INC.

482 CANAL ST.

NEW YORK 13, N. Y.



ROBERTSON'S ECONOMY SPEED HACK SAWS

The No. 4X Type Robertson ECONOMY Saw is especially suited for heavy, continuous production metal cutting and gives smoother action and faster cutting. Other salient features include—

 Bronze brushed journal bearings
 Standard stroke of 6" • Automatic stop • Gravity feed with adjustable pressure blocks • Hydraulic lift on back stroke • Standardized construction • Accessibility to all parts • Few adjustments.

Robertson ECONOMY Power Hack Saws are in use throughout the world—more than 30,000 have been installed. Make your next power hack saw a Robertson ECONOMY for speed and accuracy.

Robertson builds a complete line of Power Hack Saws in sizes and types to suit your needs. Send for illustrated folder Form 1-A which gives complete details.

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W. ROBERTSON

MACHINE & FOUNDRY CO., INC.

52 RANO ST.

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BROACHES

Converted, Reconditioned, Sharpened. Prompt service on sharpening.

> Manufacturers Broaches

Most Standard Keyway Broaches Carried In Stock.

Reconditioning, salvaging and converting high speed and carbide tipped metal cutting tools.

CONANT TOOL & ENGINEERING CO.

347 WEST 107TH STREET CHICAGO 28, ILLINOIS

Machined

Standardized Die Sets, embodying many exclusive features, a listing of more than 195,000 stock sizes and 46 different styles afford a service that is unsurpassed.

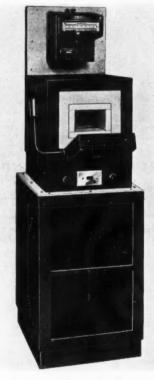
Send for Our New Catalog

BAUMBACH MFG. CO.

1806 S. Kilbeurne Ave.

steel reamers, cutters, tools, and so on, has been brought out by the K. H. Huppert Co., 6830 Cottage Grove Ave., Chicago 37, Ill. The furnace is recommended for continuous operating temperatures up to 2,200 deg. F. and intermittent temperatures up to 2,250 deg. Fahrenheit.

The Hi-Temp is available in a floor and table model, each of which is furnished complete with automatic temperature



Huppert "Hi-Temp" Furnace

control and features multi-insulation; high-temprature alloy elements; "on-off" switch; two pilot lights (one for indicating that the furnace is in operation and the other serving as a safety light to indicate any failure occuring in the heating elements); all-steel heavy-duty construction; counterbalanced door; and black wrinkle finish. Both models are supplied ready for operation by merely connecting the line to the outlet box provided with each furnace.



5-PLUS FEATURES

- Greater accuracy and stability
- Longer wear life
- Less weight

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- Positive identification
- Positive adjustment

ACCURACY YOU CAN TRUST

WOODWORTH THREAD RING GAGE PROVES AMAZING SUPREMACY OVER ORDINARY GAGES

Almost unbelievable results on actual shop inspection prove the new Woodworth Adjustable Thread Ring Gage far superior to ring gages of ordinary design.

ONE MANUFACTURER, USER OF MANY GAGES, MAINTAINED ACCU-RATE INSPECTION WITH A SINGLE WOODWORTH GAGE TWELVE AND ONE-HALF TIMES LONGER THAN WITH ANY RING GAGE PREVIOUSLY USED. THINK WHAT THIS MEANS TO YOUR GAGE COSTS.

Wire or write for folder No. 46R.

WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION, 1300 E. NINE MILE ROAD - DETROIT 20, MICHIGAN
PRECISION GAGES - PRECISION MACHINED PARTS - DIAPHRAGM CHUCKS - ADJUSTABLE CLAMPING JIGS - SPECIAL TOOLS

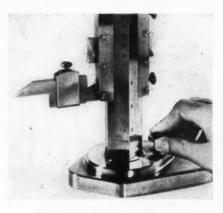
The Huppert Hi-Temp Furnace is constructed for operation on 110 volts, a.c. only, with a current consumption of 2 kw. In both the floor and table model, the furnace has the same inside dimensions of 5½ inches wide x 3% inches high x 6 inches deep (3½-inch throat additional). The outside dimensions of the table model are 18 inches wide x 32 inches high x 20½ inches deep, while those of the floor model are 18 inches wide x 63 inches high x 22 inches deep. Measuring 41 inches from its bottom inside dimensions to the floor, the floor model is equipped with two convenient steel shelves for temporary storage purposes.



Detroit 4, Michigan

Chesterman 48-Inch Height Gage

The George Scherr Co., Inc., 198-A Lafayette St., New York 12, N. Y., announces the Chesterman 48-Inch Height Gage illustrated herewith for the precise inspection, layout, scribing, and checking of large size jigs, fixtures, dies, and castings. Sturdily constructed, the gage employs an extra large vernier measure-



Chesterman 48-Inch Height Gage

ment 2.450 inches long. The verniers, which read to 1/1000 inch on the English scale and to 1/50 of a millimeter on the metric scale, may be quickly read without the necessity of removing the gage from the work. The graduations are made on a heavy triangular beam, and quick adjustment of the gage obtained by simply pressing two lugs.

The Chesterman Height Gage is hardened and ground all over and is claimed to have extremely accurate graduations. In addition to the 48-inch size, the gage is manufactured in 12, 18, 24, and 40-



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.

The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in A" to 1" diameters. Sendfor price list.

HEIMANN MFG. CO.

330 Lincoln Ave.

Urbana, Ohio

NICHOLSON EXPANDING MANDRELS



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SET OF 19 DOES THE WORK OF 209 SOLID ARBORS

Nicholson expanding mandrels cut costs 2 ways: first, by saving the time lost in making or looking for solid arbors; second, by promoting precision. Hardened tool steel, accurately ground. Two types. Sold singly or in sets. Bulletin 1043.

W. H. NICHOLSON & CO.

136 Oregon St., Wilkes-Barre, Pa.

TYPE A-STEP JAW DESIGN

	No.	Range of Bores Taken	Length Overall
7	1A	1/2" to 1"	9"
	2A	1" to 11/2"	11"
	3A	1 1/2" to 2"	1214"
	4A	2" to 3"	201/2"
	5A	3" to 4"	21"

TYPE B-STRAIGHT JAW DESIGN

Size No.	Range of Bores Taken	Length Overall
1X	1/2" to 18"	5"
2X	* to 21/32"	6"
3X	21/32" to 34"	6"
00	3/4" to 7/8"	81/4"
0	%" to 1"	81/4"
1	1" to 114"	9"
2	14" to 14"	11%"
3	1 %" to 2"	13%"
4	2" to 21/2"	1744"

(Other sizes taking up to 7" bores.)

NEW DORMAN TAPPERS

attach directly to
ALL MALE SPINDLE DRILLS

including Walker-Turner, Atlas, Buffalo Forge, Boice Crane, Cannedy Otto, Etc., also available with Morse Taper in place of Adaptor.

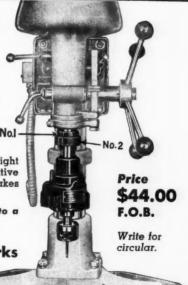
DORMAN Friction Drive Automatic Reverse No.1— Tapper drives from 2-56 tap to %" in any tapable material. Friction adjustable from light drive for small tap in soft material to positive drive with %" tap in steel. Adjustment takes less than one minute.

In Two Minutes Convert Your Drill Press Into a Sensitive Precision Tapping Machine.

Manufactured by

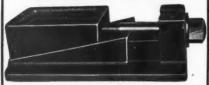
Dorman Machine Tool Works 357 Canal Street

New York 13, New York



Do you want accurate work from your machines? . . . then use

LEVELING JACKS



Under the next heavy machines or any equipment you will install or rearrange.

Leveling jacks are indispensable and a real help to your reconversion problems making re-arrangements easy and fast.

We make them in three sizes which cover the entire range of requirements.

Write for descriptive literature and prices.

Jurzek Machine & Engineering Co.

326 W. Lewiston Ave., Ferndale 20, Mich.

STANDARD IS SINCE 1915

HEADS
FIFTY-SIX
SIZES

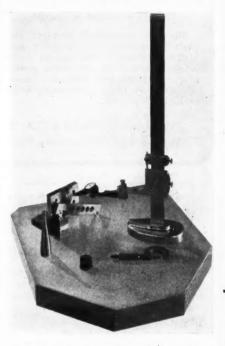
Two Spindle Head
Both Spindles
Adjustable

United States Drill Head Co.
Cincinnati 4, Ohio

inch sizes provided with both English and metric scales. The gage is supplied complete with a master gage block for checking vernier setting and a depth rod for taking depth measurements.

"Profilm" Laminated Glass Surface Plate

A laminated glass surface plate to be known as the "Profilm" has been developed by the Profilm Corp., 2230-1 S.



"Profilm" Laminated Glass Surface Plate

Dixie, Dayton, Ohio. The surface plate is made of from 5 to 16 layers of transparent glass and has a finished size of 16 x 17 inches. It is 2 inches thick and is said to be finished to an accuracy of within 0.00005 inch.

According to the manufacturer, the Profilm Laminated Glass Surface Plate is non-abrasive, non-magnetic, non-corrosive, unusually durable, and temperature resistant, and is designed to provide for a reduction of shadows with conse-



. . . for simple, effortless control of air and hydraulic cylinders

Hanna Foot Valves provide quick, almost effortless control—free hands for holding work, feeding or removing pieces, and all other things that hands alone must do. Consider Hanna Foot Valves wherever possible. They will speed production, increase efficiency, reduce operator fatigue. Soundly designed for foolproof operation, sturdily built of quality materials—Hanna Foot Valves will prove a worthy part of every machine or operation where they are used. . . . Write for bulletin.

Features

- 1. No packing to replace.
- 2. Easy to maintain.
- Balanced spool. Effort to operate valve not affected by varying line pressures.
- Inside valve parts of corrosion resistant materials.
- All passages in the valve are full pipe size or larger.
- Available in ¾", ½", ¾", and 1" pipe sizes.
- 7. For 250 P. S. I. air pressure or 1,000 P. S. I. oil pressure.



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Hanna Engineering Works

HYDRAULIC AND PHEUMATIC EQUIPMENT . . . CYLINDERS . . . VALVES . . . RIVETERS

1765 Elston Avenue, Chicago 22, Illinois

June, 1946

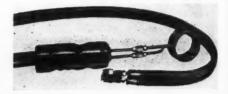
MODERN MACHINE SHOP

quent less eye strain. In connection with the marketing of the Profilm, the company is offering an overnight lifetime regrinding service on all such plates.

"Thermonic" Flexible Leads and Coil for Induction Heating

The use of induction heating with somewhat the same flexibility as the soldering iron or oxyacetylene torch is now said to be possible by means of the flexible lead and coil setup developed by the Induction Heating Corp., 389 LaFayette St., New York 3, N. Y. The heating coil is mounted on a convenient grip-type handle and is connected to a standard "Thermonic" output transformer by specially designed flexible leads, which enable the coil to be brought to the work so that many bulky assemblies that previously did not lend themselves to induction heating can be subjected to such an operation. Suitable for both heat treating and brazing, the coil, according to the manufacturer, is being used extensively in annealing such sections as the ends of large shafts and in brazing large, tubular steel assemblies.

The heating coils can be used as either single or multi-turn coils, although the single-turn inductors limit to some extent the amount of power which may be transferred to the work. By the use of Thermonic output transformers, the terminal



Thermonic Flexible Leads and Coil for Induction Heating

voltage of the coil is said to be reduced to such a value as to minimize the danger of arc-over to the work and any hazard to the operator. In this manner, the necessity for keeping the work precisely located within the coil is claimed to be eliminated, and unskilled operators are said to be able to solder or braze joints with few instructions.





A Centered EYE in 1 Operation

The DI-ACRO Bender makes perfectly centered eyes from rod or strip stock at a high rate of production. Both eye and centering bend are formed with one operation. Any size eye may be formed within capacity of bender and ductile limits of material.

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DI-ACRO BENDERS

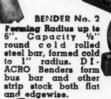
DI-ACRO precision bending is accurate to .001" for duplicated parts. DI-ACRO Benders bend angle, channel, rod, tubing, wire, moulding, strip stock, etc. Machines are easily adjustable for simple, compound and reverse bends of varying radii.

Send for Catalog "DIE-LESS DUPLICATING

showing many kinds of "DIE-LESS DUPLICAT-ING" produced with Brakes and Shears.



BENDER No. 1 Forming radius up to 2". Capacity 7/32" round cold rolled steel bar or equivalent. All DI-ACRO Benders have two - way action, right or left hand mounting and re-versible to r m i n g





Forming radius up to 9".
Capacity 4"
round cold rolled steel bar, form formed radius. Bender No. 3 is especially designed for aircraft

'NEIL-IRWIN mfg.co.





renounced "DIE-ACK-RO"

306 8th Ave. S., Minneapolis 15, Minneseta



"Fosterite" Moistureproof Insulation

Known as "Fosterite," a material for insulating equipment against attack by moisture is announced by the Westinghouse Electric Corp., East Pittsburgh 30, Pa. The insulation, as described by the manufacturer, is a synthetic material, not just one but a whole family of them of the genus alkyd-vinyl. Each, as made and applied, is a thin liquid which sets by heat into a permanent solid material that is durable and sheds water.

According to the manufacturer, Fosterite is an organic insulation and has the

View of department in which "Fosterite" is being applied to communication transformers to provide a moisture-resisting insulation

limitations of such. In addition, it is said to be adversely affected in setting by bare copper and by certain asphalts and gums that may be present in some insulations. Thus, it cannot be applied indiscriminately.

Beyond providing a moistureproof insulation for small communication transformers, Fosterite can also be used as a moisture proof filler for castings that develop blowholes or troublesome porosity. Other probable applications include motor stators and armatures.

Deublin Union

The Deublin Union, a rotating water joint for cooling revolving shafts, cylinders, or has been announced by the

drums, has been announced by the Deublin Co., Northbrook, Ill. Leak-proof, corrosionproof, frictionless, and sturdily constructed, the union, it is claimed, will also fully handle liquids for heating up to 200 deg. Fahrenheit.

The Deublin Union utilizes a helical groove on the rotor which runs counter to the direction of rotation. The sweeping action of the helix is said to prevent leakage between the shaft and the housing, as well as to keep foreign objects from lodging between the two surfaces. A maximum clearance of 0.0005 inch is provided between the shaft and the housing. The rotor concentricity is held to 0.001 inch total indicator reading.



dial adjustment. Prompt delivery—even on specials. Write for Catalog No. 15.

CARL WIRTH & SON, 1625 Clinton Ave. N., Rochester, N. Y.





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The rotor is machined of stainless steel to provide maximum tensile strength. The housing is of bronze. Both the rotor and housing are said to resist the corro-

Deublin Union

sive action of water, brine, and other similar liquids that may be used for cooling or heating. Standard sealed "lubricated-for-life" ball bearings provide for practically frictionless freedom of movement, it is stated. Wobble is said to be eliminated by the special tooling of threads which are concentric in relation to bearing surfaces.

The Deublin Union is made in two types: namely, Monoflow and Duoflow. Both types are available in four standard sizes, however, due to the basic design of the union, it can be manufactured in any size from 1/4 to 6-inch pipe size.

Fiore Alloy Sprayer

A self-contained precision type metal spray gun that is designed to melt and spray low melting temperature alloys and metals, to be known as the Fiore Alloy Sprayer, is now being marketed by the Metaloy Sprayer Co., 135 Liberty St., New York 6, N. Y. According to the manufacturer, the gun can be used for either intermittent or production spraying and has been successfully used in spraying lead-tin bismuth alloys as well as lead alloys, tin, bismuth, zinc-cadmium alloys, and others.

The Fiore Alloy Sprayer is designed to provide extremely close control of the amount and characteristic of the spray. thus making the unit particularly useful in selenium rectifier cell manufacturing





for applying a finely atomized surface of spray metal, as well as for coating patterns and core boxes in foundries, producing molds and dies, reproducing parts, and so on. Although constructed primarily for continuous duty service, the gun, as a result of the design of the stainless steel melting pot, can be used for intermittent spraying without emptying the pot during the off periods. Inasmuch as the nozzle is completely submerged at all times, oxides normally

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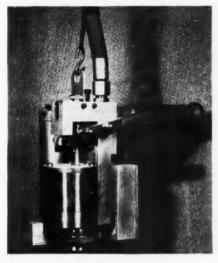
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Fiore Alloy Sprayer

forming in the pot cannot reach the nozzle to clog it, thus eliminating the need for cleaning the nozzle aperture.

Easy to operate, the Fiore Alloy Sprayer is said to be positive and instantly responsive no matter how long it stands unused. High reserve wattage heating elements in conjunction with an adjustable rheostat make possible quick heating and eliminate the need for an auxiliary melting pot, it is claimed. Metal or alloy in stick form is inserted in the pot through a guide ring and feeds down as it melts. Metal and alloy can also be inserted in the gun by using a ladle and funnel.

Monarch Live Center

Applicable to lathes, turret lathes, screw machines, cylindrical grinders,

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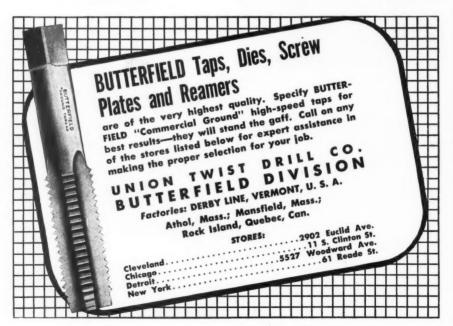
point is removed. When the point is replaced, the bearings are said to be positively sealed against all foreign matter.

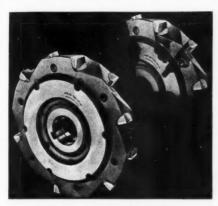
thread grinders, milling machines, and thread millers, a live center with interchangeable point is now being marketed under the trade name of Monarch by the Royal Products Co., 68 Spring St., New York, N. Y. According to the manufacturer, a plus or minus 0.0001-inch tolerance is obtained when points are interchanged, this unusual accuracy being achieved through the tapered seat on each point and in the base. When a new point is inserted, the tapered seats meet and align the point. The threaded end of the point is screwed into the case and holds the point firmly in place.

The Monarch Live Center is greased through the opening from which the

Lovejoy Type "F" Slotting Cutter

Sensitive control of blade settings, obtained by the addition of a screw adjustment to the blade "positive-locking" device, is the principal feature of the redesigned slotting cutter now being manufactured by the Lovejoy Tool Co., Inc., Springfield, Vt. As shown in the phantom view, each blade is set at a slight angle to the cutter body. When blade adjustment is required—either for resharpening or for exact control of slot width tolerances during milling—the positive-locking device is loosened by unseating a taper pin. A recessed head screw, located at the bottom of each blade, is then turned to move the blade





Lovejoy Type "F" Slotting Cutter

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up (or retract it) the exact amount required. When properly set, the blade is positively locked in the body by reseating the taper pin.

Savings on carbide are effected when resharpening since each tip need be moved up only a sufficient amount to be cleaned up. An additional long-life provi-

sion is the extra large tungsten carbide tip on each blade.

The forged steel body of the cutter is of rugged and massive proportions with ample chip clearance provided. The deeply set blades are backed with a large volume of solid steel so as to enable the blades to withstand heavy or intermittent cuts without loosening or breakage. For fly cutting, several blades can be removed without affecting the housing strength, it is claimed.

The Lovejoy Type F Slotting Cutter is available in both positive and negative rake styles in face widths from $\frac{7}{16}$ to $\frac{11}{2}$ inches, the diameters being 5 to 18 inches. The cutter may also be furnished equipped with either high speed steel or

cast alloy blades.

Lincoln Park Cemented-Carbide Wire Type Plug Gages

Another application of Carboloy cemented-carbides to gaging equipment has been introduced in a line of reversible wire type plug gages now being produced by Lincoln Park Industries, 1719 Ferris Ave., Lincoln Park 25, Mich. The gages

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are being manufactured in a size range from 0.025 to 0.375 inch and are made to

Class XX and X tolerances.

According to the manufacturer, the high elastic limit of cemented carbides ensures against bent and deformed wires. In addition, the use of Carboloy, it is claimed, provides assurance that members will be non-corrosive and will not rust in the handle; that they will be non-magnetic, eliminating any possibility of the gages picking up chips or other metallic substances which might scratch the work. The members are easily adjusted for length by loosening nuts in

the ends of the handle, and can be cut off as worn or reversed in the handle as desired.

Two styles of handle, both of collet type construction, are supplied. An outstand-



Lincoln Park Cemented-Carbide Wire Type Plug Gages

ing feature of the gages is the flexible all-metal handle supplied for sizes up to inch and which is said to reduce the hazard of breakage of the members due to accident or rough handling. In the larger sizes, rigid, lightweight, all-metal handles, designed to provide maximum strength and durability are furnished.

The MEEKER Timken Roller **Bearing Live Center**

The original live center with replaceable point. With the Greater Accuracy and Load Carrying Capacity of Timken Tapered Roller Bearings.



The bearings are provided with adjustment for pre-load and take-up for wear should

Removable points may be replaced with new points, or points of special design. Seat for point ground after assembly, assuring true running interchangeable points.

Meeker Manufacturing

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CLEVELAND 10 OHIO

Pease "88-R" Printing and Developing Machine

Known as the Pease "88-R" a dry direct process printing and developing machine for producing high quality white prints in cut sheets or rolls in one continuous operation at a speed of 30 feet per minute has been developed by The C. F. Pease Co., Chicago, Ill. The ma-chine is said to be easy to operate, re-quire minimum operator attention, and provide for maximum operator comfort.

Mechanical speed control of the machine is claimed to be instantaneous and positive. Maximum printing speed is as-



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sured by locating within the cylinder contact a 75 watt per inch high pressure mercury tube which not only produces the proper type of light for rapid printing but emits the light in an even flow over the full width of the tube. An Alzak reflector, to utilize maximum light value produced, also serves as a variable light shutter to control printing speed.

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An outstanding advantage of the Pease 88-R Printing and Developing Machine is the optional use of revolving or sliding contact. A simple clutch lever allows the operator to instantly convert from revolve to sliding revolve in which the cylinder runs slightly faster than the tapes.



Pease "88-R" Printing and Developing Machine

The contact cylinder is cooled by the same blower which forms the vacuum to convey exposed prints to the ammonia fume developer. After exposure, the tracings are staked in a receiving tray after falling easily and naturally onto the tape conveyor. A convenient foot treadle allows tracings and paper to be withdrawn easily and without damage. Finished prints can be delivered at the front or rear instantaneously by means of a lever at the front of the machine.

The ammonia fumes used for developing are controlled by a selective ammonia

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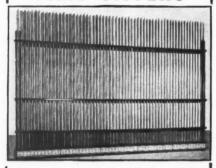


WORCESTER, MASSACHUSETTS

feed which is either manual or automatic. as desired, and which is said to afford complete control of ammonia consumption under all conditions of room temperature and material.

Sturdily built, the machine has an arc welded heavy structural steel framework, and all parts exposed to ammonia fumes are fabricated of stainless steel or aluminum. Safety is said to be assured by fully enclosing the machine. All dangerous moving parts and electrical circuits are behind locked doors which automatically break the high voltage circuits when opened.

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WALL TYPE DRILL ROD RACKS

Handles rods from 3" to 36" lengths. Made of sheet metal and supporting strap iron. Comes knocked down—easily assembled in 5 minutes. • Number size rack holds No. 1 thru No. 60. Fractional size rack holds 1/32" thru 17/32" by 64ths. • Number or fractional indexes easily read by aid of decimal equivalent. Open territory available.

GRINDING SUPPLY COMPANY

415 So. Western Ave.

Chicago 12, III.

BMC Model No. 9 Pressure Lock Wrench

Designated as the Model No. 9, a larger size of its precision pressure lock wrench which is said to be particularly well adapted to a wide variety of uses in the machine shop field is announced by the BMC Manufacturing Corp., 5-9 Griswold St., Binghamton, N. Y. The wrench has an overall length of 8½ inches and a jaw



BMC Model No. 9 Pressure Lock Wrench

opening which is adjustable to 1 inch. The tool can be used to provide a gripping power of over one ton which can be readily maintained by locking the wrench jaws. A flip of the wrench lever provides for the release of gripping power.

Designed for one-hand operation, the BMC Model No. 9 Pressure Lock Wrench is provided with a nut which may be adjusted by the thumb and forefinger to regulate the jaws. A calibrated scale and indicator show the width of the jaw opening. According to the manufacturer, the jaws of the wrench are parallel at any opening, thus providing a maximum gripping surface.

Sturdily constructed throughout, the BMC Model 9 Wrench features a heattreated steel body and a hard-drawn steel music wire spring which controls the locking device. The handle insert is of tough red Tenite plastic.



Speed Production, Cut Costs

Here's how Oakland Machine Works*—an aggressive small shop doing diversified job-lot work, keeps tool costs low, makes fast changeovers, and meets close schedules:

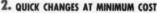
- They plan tooling to widely use low-cost, readily available "Standard" Carboloy Tools—adaptable to 60-80% of most jobs.
- For "special" tooling—not adaptable from "standards"—they design and tip them with inexpensive "Standard" Carboloy Blanks from stock.

Whether your machining applications involve quantity production or job-lots, your plant, too can benefit by this low tool cost, wide adaptability, and ready availability made possible by Standard Carboloy Tools and Blanks. Write for Catalog GT-175-R.



1. EXTRA DIVIDENDS FROM "STANDARDS"

On this job-lot application—machining cast iron pulleys—
"Standards" not only held down initial tool costs but also stepped up production; kept machines running 4 times longer per tool grind. For maximum savings, Standard Carboloy Tools were adapted to 8 roughing and finishing operations; while all "specials," except drill, were tipped with "Standard" Carboloy Blanks.



On job-lot work, set-ups change frequently! "Today" the job is a carbide-tipped 11-tool set-up for cast iron water pump housing parts. "Tomorrow" it may be an entirely different 27-tool set-up for one-piece aluminum fans and pulleys. By carefully planned use of adaptable "Standard" Carboloy Tools, Oakland keeps tool cost down despite frequent changes.

3. MACHINING CAST IRON HOUSINGS AT 340 F.P.M.

When carbide tools went on this job—machining cast iron water pump housings—speeds jumped to 340 F.P.M., tool life stepped up 600%. For extra economy, the 7 tools used were made with "Standard" Carboloy Blanks, available from stock at low cost.





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Oakland Machine Works regularly uses 3 of these Standard Carboloy Tool styles.

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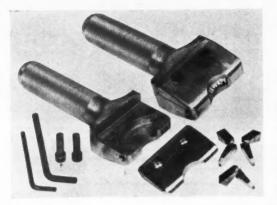
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(ARBOLOY



New Method Convex Marker

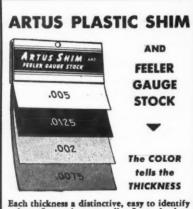
A convex marking device for stamping part numbers, serial numbers, dates, and so on, on the periphery of cylindrical shaped parts has been introduced by New Method Steel Stamps, Inc., 147 Joseph Campau St., Detroit 7, Mich. Features of the device, which can be used for hand or machine stamping, are the speed with which type may be changed and the rug-

gedness of its general construc-

Interchangeable steel type characters are held firmly in place by a steel plate attached to the body of the holder with two set screws—a construction which allows for quick changing and easy setting up of interchangeable type. Each plece of type bottoms firmly against the hardened steel anvil of the type-holding recess. In this manner, impressions of equal depth and clarity for all char-

acters are said to be obtained with one blow of a hammer.

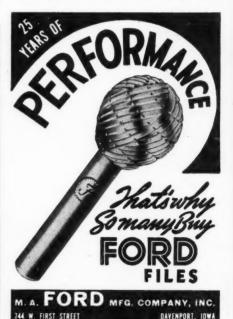
The New Method Convex Marker is of semi-standard design, since parts to be marked having different radii require different holders and type. The type capacity can also be readily varied to meet individual requirements by using spacers where full type capacity is not necessary. The handle of the holder is knurled to



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provide for firm gripping and is tempered to assure long service under severe operating conditions.

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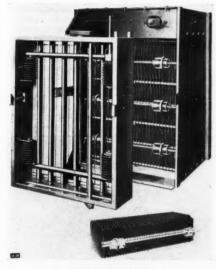
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The Electro-Cell, a unit type electronic air filter with removable collector plate assemblies, is now being manufactured by the American Air Filter Co., Inc., First and Central Aves., Louisville 8, Ky. The positive and negative collector plates are assembled on cross rods to form horizontal groups which are easy to handle and may be readily removed from the filter casing. This makes pos-



AAF Electro-Cell

sible a number of innovations in construction which simplify installations, improve performance, and assure easy maintenance.

Sliding into the filter casing in much the same manner as a desk drawer, plate assemblies can be removed for cleaning and reolling at convenient water and sewer connections. By keeping a spare set of plates sufficient for one section for use as a replacement, the length of time the filter is out of service is reduced to a minimum and the dirty collector plate assemblies can be cleaned at a time that is most convenient for maintenance

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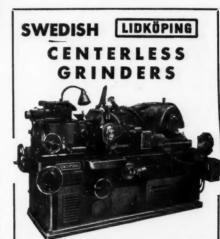
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NEW YORK 7, N. Y.

personnel. An automatic washing device has been developed permitting collector plate assemblies to be washed in place for installations where manual washing is not feasible.

Standard sections of the Electro-Cell are 2 and 3 feet in width with a capacity of 1,000 c. f. m. per unit and range from this minimum to as many sections as are needed for the particular installation. The filter is manufactured in a variation of heights from a minimum of 27 inches to a maximum standard height of 15 feet by 9-inch increments.

In the larger sizes of the Electro-Cell (6 feet or higher), the ionizers are mounted on a bar hinge which swings clear of ductwork or adjacent sections, affording full access to collector plates. Extending the full height of the section, electrical losses are reduced to a minimum due to few wire ends.

Leslie No. BA Air Operating Valve

A self-sealing, air operating, ball type valve designated as the Type BA has been announced by the Leslie Co., 133 Delafield Ave., Lyndhurst, N. J. Fitted with a hand opening lever and a rotat-



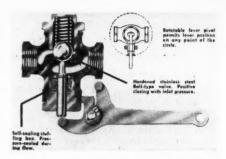
TYPE HOLDERS AND TYPE ROLL MARKERS .

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AND SPECIAL STAMPS INSPECTORS STAMPS

MACHINE ENGRAVING PRECISION DUPLICATING

NEW METHOD STEEL STAMPS, Inc. 149 Joseph Campau, Detroit 7, U.S.A.



Cross-Sectional View of Leslie Type BA
Operating Valve

able pivot so that the lever can be located in any position, the valve can be opened instantly from any position with either a horizontal or vertical pull. The ball is arranged to close tightly with inlet pressure and is constructed so as to eliminate the collection of dirt or other foreign matter.

The stuffing box of the Type BA valve is not accessible to tampering or adjustment and is self-packed by the operating pressure when the valve is open, thus



permitting flow. The valve is recommended for use with operating pressures up to 200 p. s. i., and is constructed with a cast iron body having integral seating surfaces and screwed connections.

When fitted with a cam-operated lever, this ½-inch valve permits instantaneous valve opening and closing by throwing the lever in the desired direction. The lever is held in the position thrown until manually returned to its original position. The yoke supporting the lever can be rotated around the valve bonnet to any desired location.

Whitney-Jensen No. 20 Ball Bearing Punch

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The incorporation of a ball bearing punch, designated as the No. 20, in its line of Whitney-Jensen metal-working tools is announced by the Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill. Capable of developing a punching pressure of 39,500 lb., the tool is furnished complete with one punch and die in any size from ½ to ½ inch. Riveting punches and dies (for driving rivets only) in sizes from ½ to ¾ inch are also available

The Whitney-Jensen No. 20 Ball Bear-

ing Punch can be obtained with a convenient base for fastening to a bench or in a permanent position. A ratchet



Whitney-Jensen No. 20 Ball Bearing Punch

handle also available for the tool is said to be particularly convenient when working within a limited area.

Specifications of the Whitney-Jensen No. 20 Ball Bearing Punch are as follows: capacity (mild steel), ½ inch through ½ inch; depth of throat, 2¼ inches; height of throat, 1% inches; weight of punch,

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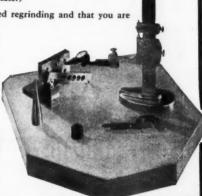
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Dayton, Ohio



18 lb.; weight of base, 5 lb., weight of ratchet handle, 3 lb.; length of ratchet handle, 7 inches.

DoAll Surface Plate

A surface plate with working area of 14 x 24 inches is announced by The Do-All Co., 1301 S. Washington Ave., Minneapolis 4, Minn. The plate is made of specially alloyed close grain iron and is well ribbed to provide ample support to the working surface, the number of ribs, their replacement and depth being carefully engineered so as to prevent any appreciable deflection in normal use. Three feet so positioned as to ensure a minimum of sagging are provided to support the surface plate.

The working surface of the DoAll Surface Plate is pin-point hand scraped with 22 or more evenly distributed bearing spots per square inch. The maximum deviation of the bearing areas from a mean plane is said to be 0.0002 inch over the entire surface. The underside of the ¾-inch overhang is machined all around thus enabling work or fixtures to be easily and firmly clamped to the surface plate. The edge of the working surface



DoAll Surface Plate

is also drilled and tapped on 2-inch centers all around to enable the user not only to make up gages and comparators from the DoAll Producto-Chek set but to mount special fixtures of his own design.

The DoAll Surface Plate is supplied with removable handles and a plywood cover. The inside of the cover is lined with a heavy oil-saturated felt so that the plate is well protected from rusting.

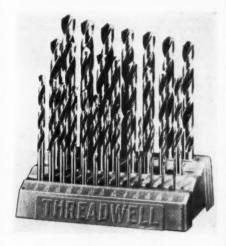




Threadwell High Speed Twist Drills

The Threadwell Tap & Die Co., Greenfield, Mass., announces a complete line of high speed twist drills, including high speed taper shank drills in all standard sizes up to 1½ inches in diameter and high speed straight shank drills in taper lengths, wire gauge sizes, and jobbers lengths.

Sets of high speed straight shank drills are offered in sturdy and convenient metal stands, as illustrated, with each size of drill plainly marked on the stand,

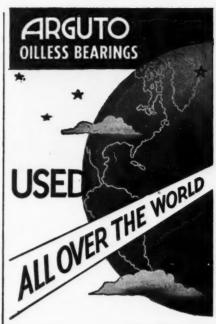


Threadwell High Speed Twist Drills

in jobbers lengths from $\frac{1}{16}$ to $\frac{1}{2}$ -inch in diameter by $\frac{1}{64}$ -inch and in wire gauge sizes from Nos. 1 to 60. Sets are also available in folding metal containers of cadmium plated steel which can be readily carried in toolboxes, and so on. The drills are securely held in easy opening compartments on which drill sizes. tap sizes, and decimal equivalents are clearly stamped.

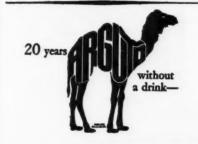
DeVlieg Matched Angle Blocks

A combination of matched angle blocks for accurately locating and chucking work for boring, milling, and planing operations and for toolroom and other general purpose uses has been announced by the DeVlieg Machine Co., 450 Fair Ave.,



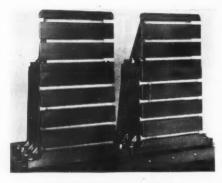
APPLICATIONS

"OUTWEARS THE BEST BRONZE METAL"





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DeVlieg Matched Angle Blocks

Ferndale 20, Michigan.

Machined from box section castings with T-slots and flat surfaces in precise alignment, the matched angle blocks may be used singly or in combinations suitable for a wide range of large and small work. The vertical face of each top member is 12 inches high x 16 inches wide and has 3 T-slots. Each bottom member, which may be mounted in two positions, includes a vertical face meas-

uring 18¼ inches high x 16 inches wide and having 4 T-slots. The top face of each member measures 12 inches deep x 16 inches wide and has 3 T-slots. All T-slots are $\frac{1}{6}$ inch wide with 4-inch centers.

Each set of DeVlieg Matched Angle Blocks is supplied complete with T-slot nuts, studs, and screws ready for immediate application.

Westinghouse 1,000-Watt Mercury Vapor Lamp

Said to be the most brilliant lamp ever developed for general commercial use, a 1,000-watt tubular bulb whose powerful yellow-green light streams from a mercury vapor arc the diameter of a cigaret is announced by the Westinghouse Lamp Division, Bloomfield, N. J. The air-cooled lamp produces 60 lumens for each watt of electricity consumed, and has an arc stream, about twice as long as a cigaret enclosed in a sturdy quartz tube which in turn, is enclosed by a hard glass exterior tube. Overall, the lamp measures 14 inches long and is less than 4 inches in diameter.

The lamp is designed primarily for the

Luma Arc Soldering Tool Resistance Type



For practically all soldering jobs. Large pieces terminals—harnessed assemblies. High production, low maintenance. Localized heat at point of application. Safe and convenient to operate. Write for details.

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Westinghouse 1,000-Watt Mercury Vapor Lamp

lighting of high ceiling factories, baseball diamonds, indoor sports arenas, and other expansive areas where a high level of lighting with a minimum of reflectors is desirable. The lamp is also well adapted for unusual applications such as the lighting of arc-welding booths.

Equipped with a mogul-screw base, the same type base high wattage incandescent lamps have, the new bulb can be burned in any position. Like all arc lamps, the lamp operates with a transformer, which steps up the voltage, and a simple current limiting device called a reactor. Because the bulb, operating at 1,100 to 1,300 deg. F., is said to generate consideraby less heat than the water-cooled lamp, it requires only a normal amount of natural surrounding air as a cooling medium.

Bailey Improved Duplicating Attachment

A greatly simplified duplicating attachment for machine tools is announced by the Balley Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio. Like its predecessor, the improved attachment is a combined air and hydraulic system which may be attached to engine lathes, turret lathes, or vertical boring mills to produce workpieces with contours that are said to

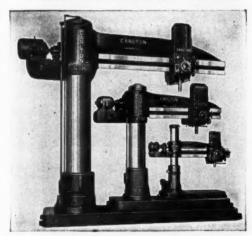
Features:

- 1. All ball-bearing throughout
- 2. Low-Hung Drive to Spindle
- 3. Quiet running at all speeds
- 4. Requires oiling only every six months
- 5. Concentrated and convenient control
- 6. Constructed on unit prin
 ciple

MADE IN SIZES OF

- 7. 3 feet to 12 feet inclusive arm lengths
- 8. 9 inch to 26 inch column diameters.

CARLTON RADIAL DRILLS



THE CARLTON MACHINE TOOL CO. CINCINNATI 25, OHIO, U. S. A.



PEERLESS ABRASIVE BELT SURFACERS

Increase and improve your flat surfacing operations with the PEERLESS Abrasive Belt Surfacer. Unexcelled for grinding flat surfaces of metal, wood, hard rubber, celluloid and plastics.

Available in 9", 14" and 20" sizes. Vertical or horizontal. Send for catalog.

PRODUCTION MACHINE CO.

GREENFIELD, MASS.

Aigh Speed
COUNTERBORES
BACK
SPOT
FACERS
Interchangable
Catalog
on
Request
BICKNELL-THOMAS COMPANY
Greenfield
Massachusetts

exactly correspond to a thin metal templet or master part.

Simplification has been achieved by applying a single hydraulic power cylinder to the lathe compound, which is usually set at 45 degrees to the longitudinal axis of the work. When mounted at this angle and used in conjunction with the standard longitudinal feed, the single power cylinder controls both longitudinal and in-out motion. Formerly, it was necessary to apply power cylinders to both the longitudinal and cross feeds for fully automatic operation, however, with the improved attachment, one small



Bailey Improved Duplicating Attachment in Use

power cylinder is said to produce practically the same net results.

According to the manufacturer, the Bailey Improved Duplicating Attachment in no way hinders the normal use of the machine to which it is applied. The standard controls for speeds, feeds, and depth of cut function equally well with or without the attachment, it is stated. The attachment is claimed to provide for the automatic sizing of tapers and radii and to eliminate the necessity of taking numerous repetitive measurements. After the machine operator has made the initial setup and tool adjustment, no further attention is said to be required other than to load and unload machine.

Step shafts, mandrels, punches, dies, valve plugs, impellers, shells, forming rolls, and bottle molds are typical of work on which the duplicating attachment may be used to advantage. The attachment is claimed to be equally well suited for turning, boring, or facing and may be applied to large or small machine tools. In the case of step shafts, all of the diameters, tapers, shoulders, and undercuts usually may be turned in a single operation.

TCT "Vibra-Cushioned" Face Milling Cutter

A "Vibra-Cushioned" face milling cutter with carbide-tipped inserted blades has been introduced by the Tungsten Carbide Tool Co., 2661 Joy Rd., Detroit 6, Mich. To decrease vibration, the carbide tips on the blades are extra thick, the blades being of a round type so as to provide an effective backing for the tips. The blades are wedge-locked into a cutter body which has the weight distributed in such a manner as to provide the maximum of "flywheel" effect, contributing to smoothness of cutting action.



TCT "Vibra-Cushioned" Face Milling Cutter

The use of a wedge-lock for individual blades together with a screw adjustment at the base of the blade permits infinitely fine adjustment of each blade as to height above the cutter body. With this construction, uneven tightening of wedges has no effect on the accuracy of the cut-

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Fluid-Motion for Modern form-dressing

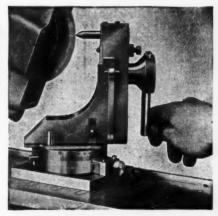
ONE SETTING HANDLE CONTINUOUS MOTION

J & S Radii & Angle Dressers in the "Fluid-Motion" veries are among the finest precision dressing instruments procurable... regardless of cost. There is a standard model to fit most form-dressing requirements.

FEATURES

Fluid-motion dressing .0001" accuracy Automatic centering 7" & 14" wheel capacities Large range yet compact Chatterless and dustproof Write for catalog

J. & S. TOOL CO.



June, 1946

MODERN MACHINE SHOP

327

ter since tightening of the wedge does not change its position or distort the outside of the cutter body, it is claimed.

Designed for National Standard drive only, the TCT Vibra-Cushioned Face Milling Cutter is available in four standard sizes of 6, 8, 10, 12 inches O. D. in both left and right-hand types. Blades are designed specifically for each size. Six-inch O. D. cutters are designed for drive through keys, while larger cutters are designed for bolting to milling machine spindles, being counterbored to fit over the spindle.

G-E Totally-Enclosed Fan-Cooled Tri-Clad Motor

A totally-enclosed fan-cooled motor especially designed for use in extremely dusty, dirty, and corrosive atmospheres has been added to the line of Tri-Clad induction motors offered by the General Chemical Co., Schenectady 5, N. Y. The motor is available in standard, explosion-proof, and dust-explosion-proof types from 1 to 1,000 h. p. and can be used where iron dust and metal filings are in the air and in Class I Groups C and D and Class II Groups E, F, and G hazard-

ous locations. Short in length and compact in construction, the motor can be installed in a small space, making it suitable for machine tool applications where the motor must be part of the driven machine.

The motor features a double-shell, castiron frame, and cast-iron end shields and conduit box for protection from external blows, dripping water, dusts, vapors, and corrosive liquids. Sealed end shields and inside joints and a one-piece double-shell stator protect windings, punchings, and rotating parts from moisture or corrosive elements. Long, close-running shaft fits, supplemented by a rotating seal, keep dirt from entering the motor along the shaft. Punchings and windings within the inner shell of the motor are cooled by a non-sparking external fan which is protected by a cast-iron housing with a screened air-intake opening.

The cast-iron bearing housings are cast integral with the end shields as a barrier to the entrance of foreign materials. An inner cast-iron bearing cap makes a complete enclosure for the bearing. As on all ball bearing Tri-Clad motors, the pressure-relief greasing system is used. Greasing can be accomplished without disassembling or stopping the motor.





Low starting current, with balanced design, makes the G-E Totally-Enclosed Fan-Cooled Tri-Clad suitable for fullvoltage starting, thus permitting the use

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G-E Totally-Enclosed Fan-Cooled Tri-Clad

of simple, inexpensive control equipment. The motor has high pull-up torque for quick acceleration, and high maximum running torque to meet temporary abnormal peaks and low-voltage condi-

Fish-Schurman Optical Contour Comparator

The Sheffield Corp., Dayton 1, Ohio, has acquired the exclusive selling rights to the Fish-Schurman Optical Contour Comparator. This instrument is used for quickly, simply and accurately comparing or examining such items as screw threads, dies, gears, and parts of instruments, profiles, and so on. It can also be used with an attachment for the inspection of opaque objects and fine assembly of exceedingly small parts such as jewels, and so on. Surface flaws and defects are revealed.

The standard model comparator has a 25-to-1 amplification, while interchangeable 13-to-1 and 50-to-1 optical systems are available as accessories, as well as other special amplifications. An enlarged image of the part being checked appears on a mat glass screen, 9 x 14 inches

One of the outstanding features of Fish-Schurman Optical Contour Comparator is the adjustable screen. A centering device enables the master pattern to be adjusted to the work, thus eliminating any magnification of error in the stage which might occur by moving the

KEEPS JOBS MOVING IN BUSY TOOL ROOMS

The Linley Milling and Jig Boring machine is especially designed to do small die, jig, fixture, pattern and model work . . . fast and accurately. Its quick setup and easy changeover cuts costs . . . relieving larger machines for their higher rated capacities.

Eight spindle speeds to 4250 r.p.m. give the Linley a speed for every need. Has direct micrometer setting and velvet-smooth feed. Rotating parts are carefully balanced . . . ball bearings grease-sealed . . . no backlash in quill travel Fits in 21/2 sq. ft. space. Table size (7" x 171/2") is ample.

Get detailed Bulletin





BURDICK DUALGAGES

Reversible Type

PLUG

GAGES



DUALGAGE-PLAIN

.020-.510



DUALGAGE—THREAD

No. 0-1/2"

Dualgages for use in our new Universal Gage Handles. We also make

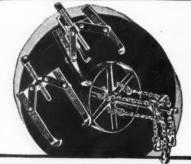
RINGS — PLUGS — THREAD or PLAIN A.G.D. STANDARD — SPECIAL

Send us your inquirles.

THE S. J. BURDICK COMPANY

230 W. HURON ST.

CHICAGO 10



ARMSTRONG-BRAY GEAR and WHEEL PULLERS

because they save hours of time, prevent costly breakage and long shut downs.

STEELGRIP Standard Rigid Arm Gear and Wheel Pullers are of improved design. Will not slip from work. Arms are forged and heat-treated. 2-arm, 3-arm and special designs. 34 types and sizes. CHAINGRIP Universal Pullers pull wheels, solid gears, pinions, etc., even at considerable distance from end of shaft. Proof-tested chains have both chain hooks and special pulley hooks. 3-ton and 12-ton capacities. Write for Catalog Sheets.

ARMSTRONG-BRAY & CO.

"The Belt Lacing People"
5346 Northwest Highway Chicag

Chicago 30, U.S.A.

stage to fit the master screen pattern. With the instrument, accurate projection of the contour of the part being inspected is instantaneous. All operations can be carried on under normal lighting, and the sharply magnified, undistorted image is said to be free from disturbing color fringes. Errors or imperfections are easily discernible, and an unlimited number of similar objects may be checked in rapid succession.

A single adjustment is all that is necessary to bring the image into sharp focus. On the screen is placed a sketch of the "standard" which has been drawn in the same scale of magnification on a



Close-up view of Fish-Schurman Optical Contour Comparator

tracing sheet. The outline of the "standard" may be drawn directly on the mat screen, if desired. A slight adjustment of the centering device of the screen aligns this drawing with the contour of the projected object.

The comparator can be used in either a horizontal or vertical position. In addition to checking and inspecting contours, the comparator may be used for examining contours and fit of small parts in motion with the use of a Stroboscope. It is also useful as a strain finder, particularly for small objects which require considerable enlargement in order

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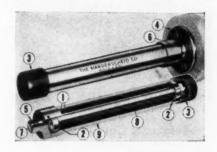
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to reveal the strains. Photographs of projected images can be produced by merely placing the comparator in a dark room, laying a sheet of unexposed photographic paper on the screen, and exposing it for the proper length of time.

sealed ball bearings mounted in precision machined seats; dustproof rubber closure; threaded shaft for fixture flange; spanner wrench hole for easy removal of fixture flange; ½-inch shaft; and 1¼-inch diameter housing, affording firm grip.



"Presto" Work Holding Spinner

The Presto Work Holding Spinner is made in two sizes; namely, No. 221 with overall length of $10\frac{1}{2}$ inches and No. 221-A with overall length of 71/4 inches.

"Presto" Work Holding Spinner

Round, cylindrical, and flat circular pieces, both large and small, are said to be polished quickly and uniformly with the aid of the "Presto" Work Holding Spinner illustrated herewith, product of The Manderscheid Co., 810 Fulton St., Chicago 7, Ill. A removable fixture flange with machined surface and screw holes provides for the easy mounting of wood blocks or other fixtures to hold parts of various shapes and sizes. Additional flanges are available to enable the user to keep any required number of fixtures mounted on flanges for instant use. For fixtures to hold small parts, a flat-headed screw is provided in the spinner shaft.

Structural features of the Presto Work Holding Spinner include a one-piece shaft and brake assembly, closing the housing against dust and grit; grease-packed and

SAVAGE NIBBLING MACHINE

FOR TUBE SLOTTING, TUBE SHAPING AND CUTTING FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE . .

It's rugged construction and ease of operation make it worth investigating.

Cutting Capacities:

MODEL No. 218

Flat mild sheets 34" Tough alloys 36"

> **Tube cutting** attachment

Tubing:

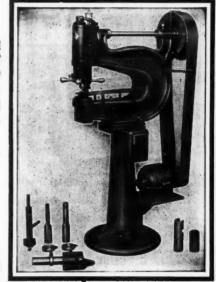
Wall thickness to 18" 1" I D. to 36" O.D.

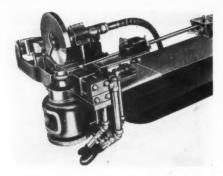
> ASK FOR BULLETIN "H" Manufactured By

W. J. SAVAGE COMPANY

KNOXVILLE

Ploneer Manufacturers of Nibbling Machines





Pines Hydraulic Bender Equipped with Automatic Cut-Off

Automatic Cut-Off for Pines Benders

The Pines Engineering Co., Aurora, Ill., announces an automatic cut-off for all six sizes of Pines Automatic Tube and Pipe Benders which are designed to handle tubing from ¾ to 5 inches O.D. and pipe up to 4 inches O.D. The ¾-inch Pines Hydraulic Bender illustrated here-

with is equipped for the fully automatic manufacture of return bends or elbows. The machine utilizes a patented booster attachment for tube feed and the automatic cut-off attachment.

In operating the bender, a long piece of tubing is placed over the mandrel and the "start" button pressed. After the machine completes the bend, the mandrel is extracted and before the clamps are opened the saw is passed through the tube by means of hydraulic power. The bending arm then returns and the mandrel advances. The tube is next fed automatically and the operation repeats. The machine continues to operate automatically until the tube is consumed. Typical production is described as 650 pieces bent and cut per hour from %-inch copper tubing, bent on a 1½-inch center.

Hobart Combination Battery Charger and Arc Welder

A combination battery charger and arc welder designed especially for charging railway coach batteries and electric arc welding but readily adaptable to a wide





variety of shops where batteries are charged and electric arc welding is performed has been developed by The Hobart Brothers Co., Hobart Square, Troy, Ohio The unit has complete, separate control panels with instruments—one for each battery circuit and one for the welding circuit.

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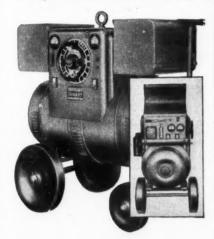
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The Hobart Combination Battery Charger and Arc Welder is available in two models designated as the Nos. 496 and 497. The No. 496 is a 300-ampere electric motor-driven welder including an MGC panel circuit for charging one railway coach battery at a maximum rate of 200 amperes at 50 volts, d.c. The Model



Three-quarter view of Hobart Combination Battery Charger and Arc Welder, together with welding control panel. Inset: Rear view of machine showing battery charging control panel for one charging circuit.

No. 497 is a 400-ampere electrically motordriven welder including MGC panel circuits for charging to railway coach batteries at one time and at a maximum rate per battery of 150 amperes at 50 volts, direct current.

Each MGC charging circuit includes a voltmeter for measuring voltage of generator and/or battery; ammeter to indicate charging current; 200-ampere knife switch to open charging circuit; 175-ampere Fusetron in charging circuit; and automatic reverse current cutout (to prevent flow of current from battery to generator). The welders are Hobart multi-range dual control electric drive types with exclusive remote controls and other features.

STAR DISPLAY

makes blade-buying quick, easy! STAR

Here's the kind of display that will remind you to buy the BEST Hack Saw Blade for the job you are doing. And that means STAR.

When you go to your dealer to purchase hack saw blades, look for this attractive colorful counter display. You can slip a blade out through the top, examine it, test its temper, its flexibility, its fine workmanship.



It's a cinch to buy blades this way

You don't buy a "pig in a poke" when you select a blade from this open-face STAR display. Blade withdrawal is a "finger-tip" operation. Just

slip a blade out through the top of the open box, and satisfy yourself that STAR blades are the blades you want for the type of work you are doing. The STAR Unbreakable Special Flexible Blade is the all-around blade for the expert mechanic.

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	Please send me a copy of your booklet "Metal Cutting"
SAME I	Name
	Address
	Kind of work
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CENTER + LOCATOR

Ingenious Center-Locator saves time and makes your drill press do the work of a jig boring machine. Now you can drill and space holes to within .001"... drill round holes in thin material... avoid drill run-outs...counter bore holes with ordinary drill. Simply lay out work with height gauge, locate center through the powerful magnifier—then replace it with any of the 16 drill bushings furnished. Ask your mill supply house, or order direct.

Literature on Request.

MASTER SPECIALTY COMPANY 3010 E. Lake St. • Minneapolis 6, Minn.

Davis Boring Tools

Plain and block type line boring tools are now being made in a wide range of designs for many individual needs by the Davis Boring Tool Division of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. Soft bars may be obtained for occasional boring operations and heat treated bars can be furnished for boring operations where cutting loads are heavy and a bar with high physical properties is needed.

When unusual or complex boring operations must be performed on various types of horizontal boring equipment, specially designed boring bars are avail-



Davis Stub Boring Bar arranged with two block type cutters

able for this purpose. Such bars may be equipped with expanding and retracting type cutters, depending upon the operation. One of the most important uses for





Davis Block Type Cutter with section cut away to show adjusting screw

such bars and cutters is for boring large engine blocks. In addition to this particular type of work, Davis bars with block type tools may be used for internal grooving, recessing, counterboring, and chamfering operations.

chamfering operations.

Multiple boring cuts may be made simultaneously by using Davis stub boring bars equipped with expanding block cutters. One outstanding feature of this type of bar is the simplicity of setup. Expanding blocks may be adjusted quickly and easily to bore diameters.

When cutters become dull, the complete block can be removed and the cutters ground in the block. The block can then be replaced with minimum handling and adjusting.

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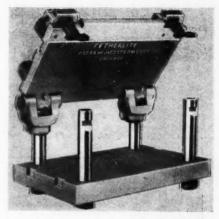
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Hedstrom "Fetherlite" Snap-Lock Jig

Hedstrom Industries, Inc., 4856 W. Division St., Chicago 51, Ill., announces a snap-lock jig to be known as the "Fetherlite." Construction is of the well-known OH-38 special aluminum alloy of marked characteristics in toughness, durability, and easy boring for bushings and pins. Its lightness makes possible easy shifting to any position so that even an untrained operator can turn out work on a high production basis without tiring, it is claimed.

Features of the jig are hand-operated clamp screws which hold the workpiece firmly in place. Quick-Latch automatic clamp screws may be used in place of the hand-operated screws, if desired.

Lock construction permits instant opening, closing, and locking of the jig. Loading and accurate placement of pieces



Hedstrom "Fetherlite" Snap-Lock Jig

are thus speeded. The unit can be easily assembled into a 1, 2, 3, or 4-way jig. Interchangeable posts allow for the accommodation of work of practically any height.

The Hedstrom Fetherlite Snap-Lock

THE "FORM - MASTER"

ANGLE and RADIUS DRESSER

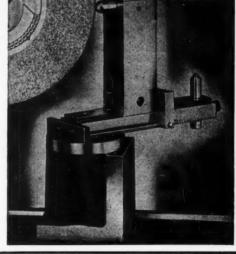
A sturdy, quality instrument designed by form-grinding specialists to dress both angles and radius at low cost. Two ½ ct. diamonds and instrument case included—\$150.00 complete.

Peatures

- Large range
- Chatterless and dustproof
- .0001" accuracy obtainable
- Simple to operate
- Reasonably priced

Call your supplier or write

J. & S. TOOL CO.
477 Main St., E. Orange 5, N. J.



June, 1946

MODERN MACHINE SHOP

335

Jig is offered in many standard sizes. as well as special sizes made to specification.

Geargrind "Ballflex" Flexible Coupling

An angular and axial flexible coupling which is designed to obtain its flexibility by mechanical means only, to be known as the Geargrind "Ballflex," is announced by The Gear Grinding Machine Co., 3901 Christopher St., Detroit

Delivery

11. Mich. Friction is lowered to the minimum by the use of hardened and ground steel balls through which all torque is transmitted. Free rolling movement in any direction eliminates slide thrust and the bending or springing of parts, both in the coupling and bearing mounting it is claimed.



Geargrind "Ballflex" Flexible Coupling

IN STOCK Immediate Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send us your blue prints Write for Catalog No. 80 GEAR WORKS

440-450 N. Oakley Blvd., Chicago 12, III.

and inquiries.

DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD Your business letterbead will bring literature. WATTS BROS. TOOL WORKS Wilmerding, Pa.

The Geargrind Ballflex Flexible Coupling has no rubber or fiber discs or sliding members. The only flexible element is a synthetic product used in the overall seal that is said to be impervious to oil and is designed to retain the lubricant and prevent the entrance of dust and liquids. According to the manufacturer, the Ballflex accommodates parallel misalignment up to 1/8 inch and angularity up to 3 degrees.

To install the coupling, it is simply inserted between flanges on the two shafts and bolted to the flanges, without

PRODUCERS OF SCREW MACHINE PRODUCTS TO SPECIFICATIONS

We have:

ONE, FOUR and SIX spindle automatics maximum capacity 25/8" round. Hand Screw Machines and Universal Turret Lathes maximum capacity 3" round. Castings and Forgings machined maximum 10" diameter, 8" length, 15 pound weight. Secondary operation equipment for milling, drilling, tapping and assembling. Fabricators of aluminum, brass, steel and their alloys.

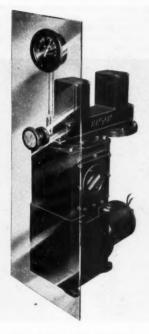
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SCREW MACHINE SPECIALTY CO., • 5700 Butler St., Pittsburgh 1, Pa.

the necessity for backing away the shafts. No lubrication of the coupling is required since it is packed with lubricant at the factory for the life of the unit and is sealed from dust or liquid, the manufacturer states.

Hagan Type 2-SO Regulator

Designed for use in regulating the ratio of pressures or differential pressures, the Hagan Type 2-SO Regulator illustrated herewith is announced by the Control



Hagan Type 2-SO Regulator

Division, Hagan Corp., Hagan Bldg., Pittsburgh, Pa. Construction features of the device include rugged and simple design, wide operating range (from 0.10inch water column to 5 p.s.i.), spinning pilot valves, positive action, and adjustable response.

The Hagan Type 2-SO Regulator is intended primarily for such applications as the control of suction, pressure, or flow ratio in any gas or air flow system where accurate control is required; control of

Why THOR STAMPS Last Longer



... because they're made of a special, correctly - heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy

You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

The Pittsburgh Stamp Co., Inc. 812 CANAL ST. PITTSBURGH, PA.

Square, Straight Tapping



it to a post or bench, slip a Tap Adaptor into the spindle, and turn the handle. Equipped with 7 Adaptors from 8-32 to ½" (taps not furnished). Literature on request. Dahlstorm Mfg. Co., 418 S. Sixth St., Minneapolis 15. Minn.

Dahlstrom TAP GUIDE

June, 1946

MODERN MACHINE SHOP

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CHASERS

(Made by the People Who Know How)

THAT GET YOU INTO PRODUCTION

Faster
KEEP YOU THERE

Longer

GIVE MORE PARTS BETTER THREADS LONGER LIFE

Order NOW
TAPPED FORM
MILLED or GROUND THREADS

CHASERS for all makes of general purpose Die Heads and Collapsible Taps

WRITE FOR CATALOG M

Chambers Chaser Co., Inc.

13-19 W. Woodruff St. Hazel Park, Mich.

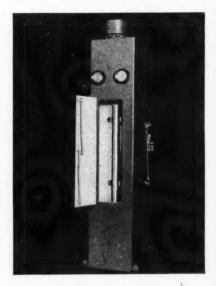




fuel-air ratio in a wide variety of industrial heating furnaces where close regulation is necessary; and control of gas or air flow proportions in industrial processes where the end result is dependent upon the maintenance of uniform or precisely adjustable conditions.

Beatty 25-Ton Hydraulic Tube Testing Press

Production of a 25-ton capacity hydraulic tube testing press with 8-inch stroke, 34-inch per minute pressing speed, and 68-inch per minute return speed is announced by the Beatty Ma-



Beatty 25-Ton Hydraulic Tube Testing Press

chine and Manufacturing Co., Hammond, Indiana.

The press, which features a daylight opening of 57 inches and depth throat of 6 inches, is designed for testing tubes up to 3½ inches I.D. and 48 inches long at 4,800 lb. per square inch hydrostatic internal pressure. However, within limitations of its pressing and space capacities, the unit can be used for tubes of other diameters and lengths with the proper ram attachments.

"Karbo Kasing" Liquid Carburizing Process

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A liquid carburizing process designed so as to enable all traces of salt to be easily removed from oil quenched work is announced by the Park Chemical Co., 8074 Military Ave., Detroit 4, Mich. The process, which is known as "Karbo Kasing," involves the use of equipment which regulates a small flow of oxygen into a molten bath containing Karbo Kase salt. The latter is a powdered cyanide salt, completely water-soluble, in which is incorporated a carbon cover.

True carbon case depths are said to be produced on steel with this combination of oxygen and Karbo Kase salt, with all traces of the salt quickly and easily removable from oil quenched work. Hot water washing only is required, and commercial cleaning compounds are said to be unnecessary but may be used if de-

The weight of the salt is 86 lb. per cubic foot and the daily replenishment required is between 5 and 10 per cent of the bath weight. Little or no sludge is produced by the bath, it is claimed, and the daily addition of fresh salt provides for the maintenance of the carbon cover. A



Sectional View of Karbo Kase Bath

working temperature of from 1,300 to 1,750 deg. F. is recommended, the salt having a melting point of 1,150 deg. Fahrenheit.

The accompanying illustration shows a tube immersed in a Karbo Kase bath from which a constant small flow of oxygen is discharged. The flow is regu-

BALANCING WAYS

Shops handling rotating parts find this simple, sturdy and thoroughly dependable device highly efficient for balancing and truing operations. It assures better work...saves time...saves labor. No leveling required.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a quick, accurate indication of whether or not the work is in perfect balance.

Swing	Greatest Distance Between Standards	Capacity in lbs.		
20 in.	20 in.	1,000		
40 in.	30 in.	2,000		
60 in.	30 in.	2,000		
72 in.	66 in.	5,000		
96 in.	88 in.	10,000		

Write for BULLETIN 6-22





lated so that the carbon cover is not dispersed. While the oxygen acts as the energizing agent, the mild agitation which it provides also contributes to uniformity

of results.

Complete equipment which governs gas dispersion consists of a two-stage pressure regulator, a rotameter for gas flow measurement, needle valve, piping, couplings, and delivery tube. A portable stand available is designed to accommodate two large oxygen tanks.

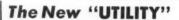
Perfection "Dry Cyaniding" Process

A "Dry Cyaniding" Process which is claimed to provide a case on low carbon carburizing steel without embrittlement or excessive distortion is now being marketed by the Perfection Tool and Metal Heat Treating Co., 1740 W. Hubbard St., Chicago 22, Ill. Case depths up to 0.025 inch (of true carbon combined with nitrogen) with a hardness in access of 60 Rockwell C are readily obtainable with the process, it is stated. Depth control is said to be unusually accurate.

"Pipetite-Stik" Pipe Joint Compound

The Lake Chemical Co., 607 N. Western Ave., Chicago 12, Ill., announces "Pipetite-Stik," a pipe joint compound in handy, clean, easy-to-use stick form. To seal a pipe joint, the stick is simply stroked three or four times across the threads, the compound spreading and filling the threads when turned. Encased in a convenient cardboard holder, the stick may be carried around in a pocket or tool kit, always ready for instant use.

According to the manufacturer, Pipetite-Stik contains no lead or other injurious ingredients and is designed to withstand gasoline, oil, butane, propane. Freon, air, water, steam, acid, gas, brine, sulphur dioxide, and so on. Joints sealed with the compound can be easily disconnected months or even years after the compound has been applied, it is claimed. The compound is said to lubricate and completely seal pipe joint threads, nuts, bolts, gaskets, turnbuckles, and so on, and to withstand vibration, temperature changes, deflection, and pressure. Joints can be remade without having to clean the threads, it is stated.





MARKING OUTFIT

Nine sizes of type stamped with the same holder—furnished in sturdy wooden box—for all interchangeable marking.

Write for Literature.





Lucifer Electric Heat-Treating Furnace

For hardening, drawing, tempering, and annealing or normalizing dies, punches, gage and fixture parts, and so on, an electric heat-treating furnace with automatic heat control is now being marketed under the trade name of Lucifer by Gilbert S. Simonski, 403 N. Broad St., Philadelphia 8, Pa. Quiet and efficient, the furnace features a cabinet which is fabricated of cold rolled steel and is attractively finished in baked wrinkle enamel. Well insulated to reduce heat loss to a minimum, the unit can be furnished with a port through the refractory for control of atmosphere.

According to the manufacturer, the automatic heat control of the Lucifer Electric Heat-Treating Furnace permits control of heat anywhere within a range of up to 2,000 deg. F. The furnace is equipped with an indicating pyrometer calibrated in both Fahrenheit and Centigrade, thermocouple, pilot light, and control switches, and is available in three models designated as the 7051, 7053, and 7052.

The Model 7051 has an interior size of $5\frac{1}{2} \times 5\frac{1}{2} \times 6$ inches, exterior size of $15 \times 15 \times 17$ inches, and shipping weight of

approximately 85 lb. and is rated at 1.2 kw. It is designed for operation on 110 volts, a. c. only. The Model 7053 has an interior size of 8 x 8 x 10 inches, exterior



Lucifer Electric Heat-Treating Furnace

size of 18 x 20 x 24 inches, and shipping weight of approximately 225 lbs. and is rated at 3 kw. It is designed for operation on 110 volts, a. c. or 220 volts, a. c. The Model 7052 has an interior size of 12 x 12 x 10 inches, exterior size of 22 x 22 x 24 inches, and shipping weight of



Get full details in Bulletin 044-MMF.

MADE IN ALL STANDARD SIZES.

HANCHETT MANUFACTURING CO., Big Rapids, Michigan

June, 1946

MODERN MACHINE SHOP

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approximately 350 lbs. and is rated at 4.8 kw. It is designed for operation on 220 volts, a. c. only.

Miniature Angular Contact Ball Bearing

Production of an unusually versatile angular contact bearing which may be used to take radial or thrust loads or a



Miniature Angular Contact Ball Bearings

combination of both is announced by Miniature Precision Bearings, Keene, N. H. Available in four sizes, the bearing requires no separator since the balls are fully self-retained and likewise no cap is necessary, it is stated.

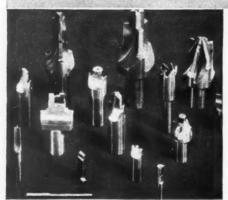
The Miniature Angular Contact Ball Bearing is said to function safely and effectively under unusually heavy loads and high speeds for its weight and size, yet respond efficiently in light service. The bearing is made of chrome alloy bearing steel to precision tolerances and is readily applicable to electric motors, scale mechanisms, accelerometers, and other equipment.

Super Solid Carboloy Blade Face Milling Cutter

A recent development of the Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich., is a face milling cutter utilizing solid Carboloy blades. According to the manufacturer, only one type of body is required for machining any material, the only variation necessary being in the angles ground on the solid carbide blade, which can be readily altered to suit any specified material.

An outstanding advantage of the tool is that it permits the use of unbrazed carbide metal which is claimed to be excellent as to grind life and unsually resistant to cracking, chipping, and breakage. The solid carbide blade is held in the head by a sturdy wedging device which permits the blade to be adjusted

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Your own products are your specialty.
 Why not let us form-grind the illustrated types of form flat-drills in which we specialize?

Our entire organization is keenly interested in "Form-Grinding" and its problems. Facilities include J. & S. "Form-Dressers," J. & S. "Form-Grinding entire include I. & S. "Form-Oressers," and all necessary form-grinding equipment. The "knowhow" developed by supplying some of the outstanding manufacturers in industry, is available for your quality tool requirements—and at competitive prices. Your requests for quotation are solicited on that basis.

Write for booklet or send prints today!

Jes

TOOL CO. 477 Main St., East Orange 5, N. J.
Manufacturers of "Fluidmalion" Radii and Angle Dressers

for wear. Simple jigs can be obtained for the easy sharpening of the carbide blades to suit all types of work.

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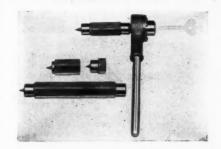
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, 1946

The Super Solid Carboloy Blade Face Milling Cutter is standardly available in 6, 8, and 10-inch diameters in both right and left-hand styles. Special adaptations of the cutter can be obtained on order. shaft. Large wearing surfaces hardened to a depth of 0.010 inch are claimed to ensure long service under severe condi-



"Liberty" Ratchet Drill-Driver

"Liberty" Ratchet Drill-Driver

Designed for drilling between studs and joists or in other restricted areas in buildings and other structures, a ratchet drill-driver which is said to provide a positive feed at each turn of the drill bit is now being marketed under the trade name of "Liberty" by Techtmann Industries, 714 W. Wisconsin Ave., Milwaukee 1, Wis. According to the manufacturer, the compact head of the unit allows for the centering of holes within 1¼ inches of the nearest obstruction. Any standard wood bit can be used with the driver which can also be made to accommodate steel drills through the use of an adapter chuck.

The thrust of the lead screw is carried directly to the drill shank by a solid

tions. If necessary, any part of the unit can be readily replaced.

The ratchet is fully enclosed in a strong semi-steel head, providing protection against dirt. A long lead screw in combination with 1, 2, and 8-inch extensions allows for the use of the ratchet drill-driver in drilling holes in a wide variety of locations. In actual use, holes up to



3 inches in diameter can be drilled without difficulty using the drill-driver, it is claimed.

Numatics Solenoid-Controlled 3-Way Valve

A compact, full ported, poppet type, solenoid-controlled 3-way valve for compressed air is announced by Numatics, Milford, Mich. Incorporating the same "fluid lever" principle that characterizes the line of 4-way solenoid valves recently developed by the company, the 3-way valve is designed to provide for straightline air-flow control with few working parts and a minimum of mechanical action.

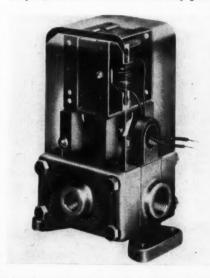
According to the manufacturer, the solenoid draws less than 3 amperes on 110-volt 60-cycle current. The short travel of the plunger—a maximum of only %-inch—together with the simplicity of the mechanism tends to eliminate pounding and harsh action, with the result that long life under severe operating conditions is said to be assured for the valve. The exhaust port is one pipe size larger than the supply and outlet,

Have you seen the new
SHELDON Lathes

sheet book and the state of the

thereby providing for rapid dissipation of the exhaust air. The user can select the setup desired by simply reversing the supply and outlet manifolds on the center body, thereby making it open to exhaust and closed to pressure or open to pressure and closed to exhaust, with the solenoid energized or de-energized.

The Numatics Solenoid-Controlled 3-Way Valve can be mounted in any posi-



Numatics Solenoid-Controlled 3-Way Valve

tion and is available in six sizes from $\frac{1}{4}$ to $\frac{1}{4}$ inches to handle operating pressures from 0 to 150 lbs. Larger sizes can be furnished on special order.

"Flo-Well" No. 2 Brazing Flux

A flux for efficient brazing of aluminum with X716 wire has been introduced by A. K. Mauk, 7501 Hamilton Ave., Pittsburgh 8, Pa. Designated as "Flo-Well" No. 2, it is claimed to be equally useful in either furnace brazing or torch brazing aluminum, can be applied easily by inexperienced workmen, and will not solidify or deteriorate.

According to the manufacturer, Flo-Well No. 2 and X716 may be employed alone in brazing 61S and, in combination with hydrogen and oxygen, may be used in brazing 2S, 3S, 24S, and 52S. The flux is packaged in ½ and 1-lb. glass jars for protection from moisture, and is also available in larger quantities.

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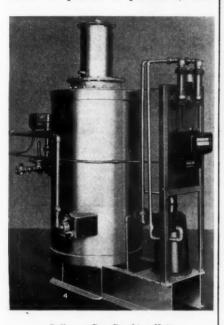
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Bellevue Gas Cracking Unit

A gas cracking unit which is supplied with a catalyst and is intended for use in conjunction with heat-treating furnaces to provide a protective, inert



Bellevue Gas Cracking Unit

atmosphere that is effective in temperatures upward of 2,400 deg. F. is announced by the Bellevue Industrial Furnace Co., 2971 Bellevue Ave., Detroit 7, Michigan.

The unit is furnished complete with all necessary controls such as pyrometers, floscopes, fire traps, automatic valves, and so on. A motor-driven Selas machine supplies any air-gas ratio desired. Natural fuel gas at 100 B. T. U. per cubic foot is employed, although manufactured gas can also be used. The fuel gas is mixed with a certain amount of air as determined by the setting of the Selas mixing machine and fed into the cracking unit, which consists of a high nickel



SIMPLY INSERT OPTI-SETTER in drill jig, align cross lines to work layout, clamp drill jig, remove OPTI-SETTER, and drill!

OPTI-SETTER Eliminates centering, errors when drilling to layouts.

Retains accuracy of original layout, whether machine drilled or drilled by hand.

A handy, low-cost tool with dozens of applications in every shop on drilling, measuring and inspection problems!

FREE FOLDER

describes Opti-Setter and uses. Write for your copy!



345

THE BENTON CO.

DEPT. M, 351 S. LA BREA AVE. LOS ANGELES 36, CALIF.

MANUFACTURERS OF OPTI-TOOLS

alloy steel retort that is heated externally by a furnace built around it. The retort is operated at a normal temperature of approximately 1,830 deg. F. and contains a quantity of high-temperature porous refractory cubes which have previously been impregnated with a special catalyst.

When the normal operating temperature of 1,830 deg. F. has been reached, the gas and air valves are opened and the Selas machine adjusted to supply the air-gas mixture desired. The heat of the retort assures complete combustion of the mixture, and the catalyst and the retort effects the reaction which produces the controlled atmosphere. Before feeding this atmosphere into the furnace muffle, it is passed through a short cooling tower to lower the temperature to approximately 250-300 deg. F. This is done merely to facilitate safe handling through the connecting pipe to the furnace, since it is not necessary to cool the atmosphere to remove water.

Lyon Internal Grooving Tool

Adaptable for recessing, grooving, undercutting, and necking, an internal grooving tool whereby single or multiple



Lyon Internal Grooving Tool

grooves can be made at a production rate by an unskilled operator has been developed by the Lyon Machine Co., 10 Pitt St., Worcester 3, Mass. According to the manufacturer, any form of groove can be made to a tolerance of 0.001 inch and dimensional accuracy between grooves can be maintained without any variation.

Designed primarily for use with an ordinary drill press, the Lyon Internal Grooving Tool can also be used with a turret lathe or boring mill, and accurate

adjustment is provided for spacing recesses from the top or bottom surfaces of work. An outstanding advantage of

MARQUETE
NICOL 44

FOR A.C.-D.C.
MACHINEABLE WELDS
WILLOUGH PRE-HEATING

★ The Original and Best Nickel Rodl This outstanding Marquette A.C.-D.C. Rod is a copper-nickel alloy with a special coating which gives excellent welding characteristics. Makes perfect bond to parent metal and leaves a soft, sound, close grained . . . and Machineable weld on all types of cast iron without pre-heating. Thoroughly machineable . . . you can easily drill or mill it. There is a complete absence of porosity, slag inclusion or hard spots and it matches the parent metal perfectly. Marquette A-C.-D.C. Nicol-Rod 44 is low

in cost, but worth its weight in gold!
. . . for years, shops and foundries have used it for salvaging expensive castings which otherwise would be rejected because of sand pockets or blow holes. It is truly a money saver in repairing castings inexpensively.

NOTE: Marquette A.C.-D.C. Nicol-Rod 44 is safe to use. There are no injurious fluoride fumes to harm the eyes, nose or throat.

LOOK TO MARQUETTE FOR LEADERSHIP

MARQUETTE MFG. CO., INC., Minneapolis 14, Minn.

MARQUETTE WELDING EQUIPMENT SOLD EXCLUSIVELY THRU THE NATION'S LEADING DISTRIBUTORS

the tool is the manner in which the cutter is fed into the work. Since the cutter moves into the work circumferentially, the operator feels the cut at all times inasmuch as the cutter tends to retract from the work rather than dig into it.

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The tool is available in three basic models which may be used with bores of from % to 4 inches in diameter. The tool is universal over its designed range merely by replacing bushings and cutters of different sizes and styles which are supplied to specifications. Cutters are furnished in high speed steels, including Clarite, Borcoloy, and Tantung, or various grades of Carboloy, depending upon the metals to be worked, the speed of production required, and other manufacturers' demands.

Rogers Special Boring Mill

Designed for a special boring operation, The Rogers Special Boring Mill illustrated herewith, product of the Rogers Machine Works, Inc., 1807 Elmwood Ave., Buffalo 7, N. Y., is a modification of the standard Rogers "Perfect 36" Vertical Turret Mill.

The design of the mill includes an extra

Rogers Special Boring Mill





These Tapping Tips of Woody's are not intended as technical advice nor are they any cure-all for tapping troubles. They are just plain short cuts, hints and horse sense suggestions that Woody has picked up from the boys in the shops and wants to pass along for what they're worth. He just wants them to save a little time or make a job run smoother and quicker.

For the specific technical problems that come up with so many tapping jobs, we suggest definite engineering advice. Send the completa data on a job, material, depth, diameter, type of hole, lubricant, etc., and our engineers will be glad to make suggestions. No obligation, of course.

Woody Spencer's new Handy Tap Guide is full of information that will make tapping jobs easier and smoother. It's in convenient size for tool crib, shop or engineer's desk. And it's FREE. Write for your copy on your company letterhead.

NOTE: These Tapping Tips are appearing here as often as Woody gets time to write them up. Look for them.

THE RIGHT TAP AT THE RIGHT TIME



June, 1946

heavy bar arrangement and a 3-jaw combination chuck for single-operation work not requiring a turret.

Electro-Air Control

A low-voltage (24-volt) control which allows for the conversion of standard machine tools and fixtures to automatic or semi-automatic production units by pneumatic control of the machine or fixing movement has been announced by the Electro-Air Devices Co., 2811 W. Fletcher St., Chicago 18, Ill. The control may be used with any standard air cylinder and can be furnished to provide either single or multiple cycle control with the addition of cycle timing, hesitation limit switches, and so on, for use in performing a wide variety of operations, such as automatic drilling, tapping, milling, indexing, and holding.

Advantages claimed for the Electro-Air Control include unusually compact design which allows for mounting in any position on the machine without hindering operator movement or vision; absence of close-fitting ports or valves which may tend to wear after long periods of service; employment of low voltage so as to

Installation Involving Electro-Air Control

sists of a step-down transformer (115-220 volts a. c. to 24 volts), Enbloc (manifold type) solenoid valves, pressure regulator, needle valves, and armature.



STANDARD

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36½" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP. 306 E. 38th St., New York 16, N.Y.

reduce accident hazard and assure unusually long life of electrical units; flexible application; and accurate, rapid control of any push or pull motion provided by the high speed action of solenoid operated needle valves. Pressure selection over a wide range is described as fast and accurate to provide exact pressure selection for the job and assure economy in the use of air power.

The basic Electro-Air Control unit con-

"Superdraulic" Pump

Known as the "Superdraulic," a pump of simple compact design with a continuous duty development of 5,000 p.s.i. and 40 h.p. and constructed to deliver 0 to 17 g.p.m. at 1,200 r.p.m. is announced by the Superdraulic Corp., 12825 Ford Rd., Dearborn, Mich. The pump is supplied in two types; namely, constant and variable delivery.

The Superdraulic Pump is a radial type plunger pump arranged so that centrifugal force maintains the plunger rollers in contact with an elliptical reaction ring. The plungers are fitted to cylinders in a rotor in one or more banks of 11

plungers per bank The rotor turns on a fixed pintle which has suitable ducts and ports for directing the oil inlet into those cylinders passing through two opposite quadrants and also for directing the oil delivery out of those cylinders passing through the other two opposite quadrants.

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Each plunger makes two inlet and two delivery strokes per revolution. A sturdy equalizing axle, journaling a roller at each end, is universally attached to the outer end of each plunger. This unique construction is said to provide ample bearing areas for the plunger load components exerted radially and rotatively on the axle bearing surfaces and ensure zero side loading of the plunger.

In the variable delivery type, two banks of 11 plungers each are arranged in a single rotor. The plungers in the two banks are arranged in parallel relation. Each pair of parallel cylinders is in open communication by means of a drilled passage in the rotor. The plunger rollers, of each bank, roll against a separate elliptical reaction ring. These reaction rings are rotatably mounted in the pump housing and are geared together so that they rotate in opposite directions in response to rotation of the volume control gear.



Variable Delivery "Superdraulic" Pump

At full delivery, the major axes of the elliptical reaction rings are parallel and at zero delivery, the major axes are 90 degrees apart. Under the latter condition, the net delivery stroke is zero, since the displacement of the plungers moving radially outward exactly equals the displacement of the plungers moving radially inward, in both delivery quadrants and both suction quadrants.



As the angle between the major axes is reduced from 90 degrees, the net plunger displacement increases. When this angle becomes 0 degrees, the major axes are parallel and both plungers of a pair of parallel plungers reciprocate in phase through full delivery and suction strokes.

Provision is made for a simple spring type plunger return. This is to ensure the return of plungers when the pump is operated below the speed at which centrifugal force is adequate (approximately 100 r.p.m.). The variable delivery type pump is equipped with any one of a number of different type volume controls which are interchangeably mounted on the pump. The sensitive manual dial type control may be mounted on either side of the pump. The surgeproof balance pressure compensator is constructed for mounting on either side of the pump, with a volume dial indicator mounted on the side opposite the pressure compensator.

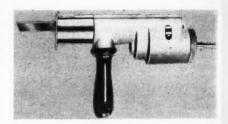
Plunger reaction loads exerted on the elliptical reaction rings are balanced through the volume control gear, the torque of one reaction ring balancing that of the other. Thus, light and sensitive manual or automatic pressure and volume controls can be interchangeably em-

ploved.

A small oil circulating pump is incorporated for the purpose of circulating oil under near zero pressure direct from the oil tank through the pump housing and back to the tank. This is said to ensure sufficiently low pump housing temperatures of the variable delivery pump under the condition of extreme operation at zero or near zero delivery.

Wyco Hy-Speed Saw

Attached to a ¼-inch electric drill, air drill, or flexible shaft, the Wyco Hy-Speed Saw illustrated herewith, product



Wyco Hy-Speed Saw

of Wyzenbeek & Staff, 838 W. Hubbard St., Chicago 22, Ill., can be used to saw and file metals, wood, and plastics. Designed for insertion in a drill chuck or collet, the unit utilizes ordinary hack saw blades and standard ¼-inch shank machine files. The construction of the unit enables it to be easily employed in difficult locations.

A feature of the Wyco Hy-Speed Saw is a square plunger with take-up for wear so as to assure accurate sawing. All rotating parts of the unit are ball bearing equipped and operate in oil, and all bearing parts are heat treated.

Bryant Portable Thread Gage

Announced by the Bryant Chucking Grinder Co., Springfield, Vt., is a portable thread gage which provides for the fast, accurate inspection of internal threads in parts where bench inspection is inconvenient or while parts are still in the machine. Constructed on the same principle as bench model Bryant thread gages, it offers a quick easy method of visually indicating the accuracy of internal threads and has the added advantage, because of its design, of disclosing any out-of-round condition.



YOUR FINELY MACHINED PARTS DESERVE THIS PROTECTION

Cost no more than makeshifts, when you count time lost, looking for makeshifts.

PRECISION DUST CAPS AND THREAD PROTECTORS

Tough fibre. Absolutely keep out moisture, rust, dust, grit, externally or internally. Shapes to every requirement.

Send for Bulletin and low prices.

PRECISION PAPER TUBE CO.

2051 W. Charleston St., Chicago 47 Mirs. of Paper Tubes, Bobbins, Spools, etc.





Formsprag Design Insures SUPERIOR PERFORMANCE

The performance of FORMSPRAG, in widely diversified industries, offers testimony to Geargrind's sound engineering, precision manufacture and proper application.

Full Complement of Sprags

With the annular space between driving and driven members completely filled with sprags, there is no need for cages to position them. Torque load is distributed over the greatest possible number of sprags. Longer life is the result.

High Torque Capacity

Formsprag is available in many sizes, providing torque load capacities from 20 to 10,250 foot pounds. Formsprag offers the highest possible capacities for size, weight and space required for installation.

Simple Construction

Cylindrical inner and outer races on which no localized wear can develop. No internal or external cams. No cages. End notches shaped to retain energizing spring and protect sprag gripping surfaces against concentrated end load. Easy installation.

Positive, Instantaneous Action

No lost motion. No backlash. No slipping. Over-runs freely, at the slightest reduction in the speed of the driving member. Engages smoothly and positively.



Write for Literature

Upon request we will send you illustrated literature, specification sheets showing capacities and dimensions of both plain and both-bearing types. To serve you hest, let us have a description of your operation, cormal and maximum torque at specified speeds, number of times a mimite the clutch engages and disengages, space limitations and other pertinent, information.

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Bryant Portable Thread Gage

The Bryant Portable Thread Gage has three thread segments. Two are stationary and one it attached to a movable arm. By pressing the operating lever, the movable segment is retracted, forming a pilot which can be inserted into the work without thread interference. Releasing the operating lever engages the segments with all the internal threads, and a partial turn of the gage provides for the inspection of the threads all over. At the same time, overall accuracy or accumulated inaccuracies of lead, pitch diameter, and thread form or presence of burrs is indicated. Since only a partial turn is needed, the segments have a long life and no taper occurs, it is claimed. Inspection of different sized threads is easily accomplished by changing the segments. The new segments are quickly aligned by setting to a master ring gage.

Sheffield "Airsnap" Fixture

Known as the "Airsnap," an adjustable fixture for use with Precisionaire instruments has been announced by The Sheffield Corp., Dayton 1, Ohio. Said to provide desirable flexibility in checking external dimensions by air, the fixture is available in eight models covering a range of from 0.250 to 2.000 inches inclusive. Larger sizes may be obtained on





Sheffield "Airsnap" Fixture

special order. The maximum diameter of the part to be checked determines the size range and model.

Standard adjustable Airsnaps can be used with Sheffield Precisionaires on dimensions with tolerances ranging downward from 0.002 inch. Special adjustable Airsnaps may be used for checking to tolerances of 0.0002 inch down to ten millionths or less.

The adjustable anvil of the unit may be located at any point within a 1/4-inch

range and is mounted so that its gaging surface is always parallel to that of the fixed anvil. The backstop is adjustable along an angular way so that when in contact with the extensions of the adjustable anvil it is square with the anvil gaging surfaces and in a proper position to automatically line up the axis of the part with the center of the two air jets. The oversize setting allows for the utilization of the full manufacturing tolerance of the part in gaging and permits the proper amount of air to flow so as to obtain a correct reading. Because of tungsten carbide surfaces, wear on the gaging anvils is claimed to be reduced to a minimum. According to the manufacturer, each adjustable Airsnap has built-in balanced airflow accuracy so that the reading does not change if one anvil is closer to the part than the other.

The Airsnap, used with the Sheffield Precisionaire, has a wide range of applications in checking external dimensions of work in or at the machine or at the bench. It can also be used on work which is too large or unwieldy to be presented to the gage and for checking close to a shoulder. Highly finished or soft-plated parts can be checked with the minimum possibility

of marring or scratching, and thin-walled cylinders can be checked on the outside diameter without damaging or collapsing, it is claimed.

"Saw-Matic" Sawing Machine Attachment

The "Saw-Matic," an attachment for converting manually operated metal cutoff saws to fully automatic operation, is now being offered by Machine Specialties, 4029 N. Kedzie Ave., Chicago, Ill. Supplied as a complete package unit ready for installation by workers in the purchaser's shop, the attachment consists of a pull-up device, vise clamp mechanism, saw lifting and lowering device, and super-sensitive length control valve of special design.

According to the manufacturer, the Saw-Matic is designed to cut pieces of any length from $\frac{1}{2}$ inch up, automatically, and will saw all day without an attendant. Consistency in length of cut to 0.010 inch is said to be achieved by the special friction pull-up device and especially sensitive valve. A change from automatic to manual saw operation can

LUCIFER

Electric Heat Treating Furnaces with Automatic Electric Control

PRICE \$188.00, F.O.B. PHILADELPHIA.

Heat treat small parts in your own plant economically. Ideal for hardening, drawing, tempering and annealing or normalizing of fine punches, gages and fixture parts. In fact—anything that will fit within our range of muffle sizes from $5^{1}/_{2}" \times 5^{1}/_{2}" \times 6"$ to $12" \times 12" \times 10"$. The Automatic Heat Control permits you to maintain any predetermined temperature within its heat range up to 2000 F. Comes equipped with pyrometer, thermo-couple, pilot light and control switches. Write fer our booklet.

Sole Selling Agent:

GILBERT S. SIMONSKI 403 N. BROAD ST. PHILADELPHIA 8, PA.

Interior size No. 7053 8" x 8" x 10", exterior size 18" x 20" x 24". Operation 110-V. A.C. or 220-V. A.C., rating 3 K.W. Shipping weight approximately 225 lbs. Operating cost approximately 6c to 8c per hour.

Distributors: New York-Connecticut: Lafayette Tool & Supply Co., 128 Lafayette St., New York 13, N. Y. Rhode Island-Massachusetts: H. Leach Machinery Co., 387 Charles St., Providence 4, R. I. California: Reagan Company, 6409 Santa Fe Ave., Huntington Park, Calif. Minnesota: Satterlee Company, 118 Washington St. North, Minneapolis 1, Minn. Eastern Pennsylvania-Southern New Jersey: Wilson Steel & Tool Co., Commercial Trust Bldg., Philadelphia 2, Pa.

MODERN MACHINE SHOP

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June, 1946

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be effected simply by turning the hand valve on the air line. The attachment can be operated from a line with as little as 60 lb. air pressure, it is claimed.

Latrobe Desegatized Steel

As a result of a process now in use by the Latrobe Electric Steel Co., Latrobe, Pa., this company has announced that the high speed steels which comprise the product of this firm now have the advantage of a more even distribution of free carbides throughout the steel and elimination of the possibility of segregation in the center. In shop performance the Desegatized steel is said to show uniformly superior results under heat treatment, longer tool life, longer run between grinds, reduction of warpage and breakage to a minimum, and allaround improvement in tool performance.

The Desegatized Process was developed by Latrobe Electric Steel Co. in the course of several years of continuous research. the purpose of which was to discover the means to overcome the segregation of a certain amount of free carbides which previously had a tendency to settle in a

brittle mass near the center of high speed steel bars and other shapes. The Desegatized Process is said to represent the greatest step vet taken toward the ideal of even distribution of the carbideswhich it achieves in a practical sense —and opens a new prospect for high speed steel quality. Desegatized steels are now stocked in all of the Latrobe Electric Co. warehouses.

Optron Interference Viewer

Uniformly accurate measurements of gage blocks, anvils, sealing surfaces, and other precision articles is claimed for the Optron Interference Viewer announced by the Optron Laboratory, 2660-B Salem Ave., Box 25, Dayton 6, Ohio. The interference patterns are both illuminated and viewed on a line perpendicular to the plane of the pattern. Distortion of the pattern is said to be completely eliminated, with each pattern appearing the same to different observers, thus simplifying inspection of one pattern by several observers.

The monochromatic light source in the Optron Viewer is completely concealed, thus relieving eye strain and eliminating



Special anvils and longer rods are also available. Write for descriptive circular.

SCHNACKE Adjustable FLUSH PIN GAGE

With this new adjustable gage, you can have an accurate Flush Pin Depth Gage quickly and save time and money. Serves many varied gaging purposes in production and inspection. Set consists of 3 interchangeable depth rods (1" - 2" - 3") and 1" diameter sliding anvil, adjustable to required depth. Sliding tolerance feelers at the top are set with micrometer screw from plus or minus .000 to .200, and locks firmly with double locks. Standard set applicable to any decimal dimension up to 3.00".

SCHNACKEJING

1017 E. COLUMBIA ST., EVANSVILLE, IND. IMMEDIATE DELIVERY

HIGH SPEED STEEL, STRAIGHT SHANK

TWIST DRILLS

Extra Length



9" CUTTING FLUTES-12" LONG DRILLS

SIZE INCHES	LENGTH OVERALL INCHES	LENGTH FLUTES INCHES	PRICE EACH NET	SIZE	LENGTH OVERALL INCHES	LENGTH FLUTES INCHES	PRICE EACH NET
1/8"	12	9	\$ 1.50	21/64"	12	9	\$ 2.25
9/64"	12	9	1.50	11/32"	12	9	2.25
5/32"	12	9	1.50	23/64"	12	9	2.50
11/64"	12	9	1.50	3/8"	12	9	2.50
3/16"	12	9	1.50	25/64"	12	9	2.75
13/64"	12	9	1.60	13/32"	12	9	2.75
7/32"	12	9	1.60	27/64"	12	9	3.00
15/64"	12	9	1.75	7/16"	12	9	3.00
1/4"	12	9	1.75			-	
17/64"	12	9	1.85	29/64"	12	9	3.25
9/32"	12	9	1.85	15/32"	12	9	3.25
19/64"	12	9	2.00	31/64"	12	9	3.25
5/16"	12	9	2.00	1/2"	12	9	3.25

HIGH SPEED STEEL, TAPER SHANK

TWIST DRILLS

Extra Length

SIZE	LENGTH OVERALL INCHES	LENGTH FLUTES INCHES	PRICE EACH NET	SIZE	LENGTH OVERALL INCHES	LENGTH FLUTES INCHES	PRICE EACH NET
17/32"	15	12	\$ 6.50	27/32"	15	12	\$11.50
9/16"	15	12	7.00	7/8"	15	12	12.00
19/32"	15	12	7.50	29/32"	15	12	12.50
5/8"	15	12	8.00	15/16"	15	12	13.00
21/32"	15	12	8.00	31/32"	15	12	14.00
11/16"	15	12	8.25	1"	20	15	16.00
23/32"	15	12	8.50	1-1/16"	20	15	17.00
3/4 "	15	12	8.50	1-1/8"	20	15	18.00
25/32"	15	12	9.50	1-3/16"	20	15	20.00
13/16"	15	12	11.00	1-1/4"	20	15	22.00

VICTOR MACHINERY EXCHANGE, INC.

251 Centre St. Phone: CAnal 6-5575 New York 13, N. Y.

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Optron Interference Viewer in Use

confusing reflections and ghost images which make uniform measurements difficult. In addition, the type of light source used in the viewer is said to provide interference patterns maximum brightness and sharpness. The viewer incorporates a feature which enables the user to

superimpose the image of any convenient scale on the interference pattern itself, thus permitting convenient comparisons of straightness or direct measurements between interference bands without using a ruler or straightedge.

The Optron Interference Viewer is constructed so as to permit the user to sit while viewing the interference patterns, an important advantage when large numbers of gaging operations are to be performed. According to the manufacturer, deviations in parallelism from ½ to 15 seconds can be readily observed with the viewer, which utilizes Haidinger bands in test for parallelism. The viewer is supplied with a six-page folder providing a simple, graphical explanation of how to use optical flats and the viewer for checking precision articles for flatness, parallelism, and size.

Keller Portable Air Hoist

The Keller Tool Co., Grand Haven, Mich., has developed a portable air hoist featuring a housing consisting of a one-piece alloy casting of high tensile strength which is said to be capable of



withstanding 16 times the rated load and which is machined to hold all parts, including the air motor, in accurate alignment without strain to the working parts. The air motor is of vertical piston design to provide maximum power for the amount of air consumed and is arranged to start and stop instantly, with all danger of overload eliminated, it is claimed.

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onensile le of The speed of the hoist can be regulated from a "creep" needed to carefully place a load into position to a maximum speed of 17 feet per minute. One motion of the control bar held by the operator provides for the opening of a non-leaking poppet type throttle valve, the sliding of a reversing valve into the desired position, the releasing of the brake, and the



Keller Portable Air Hoist

raising or lowering of the load. The brake is fully enclosed and can be easily adjusted by turning one screw. Fully mechanical, the brake does not depend on the air supply for its operation and is centrifugally governed to prevent racing when lowering the load. Safety limit stops provided on both ends of the hoist chain automatically stop the hoist and return the control valves to neutral positions, thus preventing the hoist from operating beyond a safe working position.

The lifting chain is made of high grade alloy steel and is tested to carry over 6 times the maximum rated load. A hardened steel chain stripper is said to prevent the chain from tangling. The chain sprocket is machined from alloy steel and is carefully heat treated. Both the suspension and load hook are made of dropped forge alloy steel and are ball bearing swivel mounted.

Ball bearing equipped throughout, the Keller Portable Air Hoist includes a sight



DANLY

KNURLED SOCKET-HEAD CAP SCREWS

"Danly Knurled" is noted for high quality and accuracy. Specify it by name "Danly Knurled."

DANLY MACHINE SPECIALITES, INC. 2100 South 52nd Ave. • Chicago 50, III

Milwaukee e Detroit e Cleveland e Daytor Rochester e Philadelphia e Long Island City Docommun Metals & Supply Co., Los Angeles



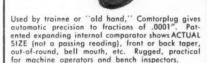
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feed oiler which provides lubrication for the valves and pistons. A one-shot grease gun fitting is said to supply all of the working parts with adequate lubrication. The hoist has a wall clearance of 5 inches and an overall length of 14½ inches, and is available in 500 and 1,000-lb, capacities.

Cooper-Bessemer Tool Holder

A line of drop-forged lathe turning and cut-off tool holders, embodying a patented feature for holding the cutting bit

For precision internal gaging to fractions of .0001"—
COMTORPLUG



Request New Bulletin 31

THE COMTOR CO.

64 Rumford Ave. Waltham 54, Mass.

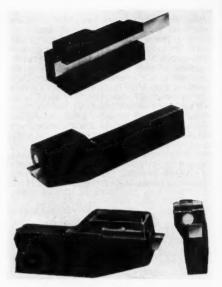


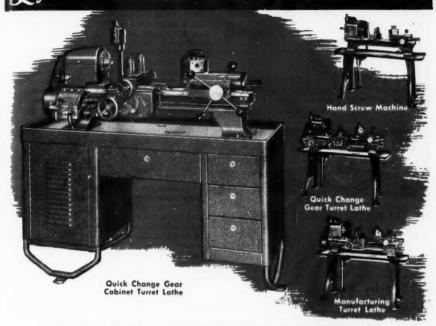
Fig. 1 (Top)—The Type "TLC" turret lathe cutoff tool holder now being manufactured by The
Cooper-Bessemer Corporation, showing the
blade side and completely assembled. Fig. 2
(Center)—The straight model Turning Tool
Holder. This model is available in both right
and left-hand types. Fig. 3 (Bottom)—A phantom view of the Turning Tool Holder showing
the patented method for holding the cutting
bit rigidly in place.

rigidly in place, is announced by The Cooper-Bessemer Corporation's Industrial Tool Division of Mount Vernon, Ohio.

The turning tool holder (see Fig. 2) is forged from a special analysis steel known for its toughness, strength and maximum resistance to wear. The patented feature is a clamping pin which



Logan A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES



LOGAN TURRET LATHES

For Speed, Accuracy, Ease and Economy on a Wide Variety of Work

The speed, accuracy and versatility which made Logan Turret Lathes so effective in war production now bring increased efficiency and decreased costs to peacetime operations. Ruggedly, accurately constructed, with heavy hexagonal turrets, they handle a wide variety of operations with the precision essential to fine work. Quickly, easily set up, they minimize time loss between jobs. Heavier, more expensive equipment is released for larger work. Production and efficiency are increased and unit costs reduced. Logan advanced design and

rugged, careful construction assure sustained accuracy. Spindles, mounted on special New Departure Ball Bearings, require no adjustment within the full speed range of 30 to 1450 rpm, and permit using high speed carbide cutting tools to full advantage. The two V-ways and two flat ways on the rugged beds are precision ground to within .0005" of parallelism. It is accuracy like this that makes ordering Logan Turret Lathes now a sound preparation for production jobs ahead. Ask your Logan Lathe dealer, or write direct for full information.

SPECIFICATIONS COMMON TO ALL LOGAN TURRET LATHES . . . Swing over bed, $10^{1}/2^{2}$. . . bed length, 43^{2} . . . size of hole through spindle, $25/32^{2}$. . . distance across turret head flats, $5^{1}/4^{2}$. . . 6 positions with adjustable stops . . . self indexing . . . maximum stroke of turret, $4^{1}/4^{2}$. . . spindle nose diameter and threads per inch, $1^{1}/2^{2} - 8$. . . 12 spindle speeds, 30 to 1450 rpm . . . motor, $1^{1}/2$ hp, 1750 rpm . . ball bearing spindle mounting . . . drum type reversing motor switch and cord . . precision ground ways, 2 V-ways, 2 flat ways

LOGAN ENGINEERING CO. CHICAGO 30, ILLINOIS

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engages the bit for nearly its entire length. Two flush-type set screws lock the tool bit into position with a vise-like grip, preventing any possible slippage. A dowel holds the clamping pin in posi-

A dowel holds the clamping pin in position for inserting the cutting tool and prevents the pin from falling out when the bit is removed, as shown in Fig. 3. This dowel is easily removed to permit taking the clamping pin out when necessary.

It is said that the exclusive design features of these turning tool holders offer the following advantages: (1) The tool bit is held rigidly in both vertical

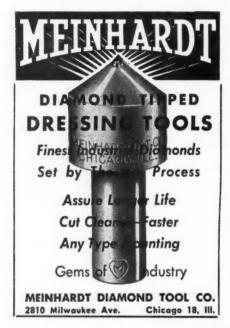
and horizontal planes, which is essential for carbide-tipped bits and is desirable for all types of cutting bits. (2) The bit is gripped for nearly its entire length, preventing slippage and creating virtually a solid mass of bit and holder, to better dissipate heat. (3) Bits cannot be mutilated by set-screw marks (4) Bits as short as they can be ground may be used. Oversize and under-size bits are held equally rigid. (5) Holder channel under bits cannot wear concave. cannot break because of set-screw pres-(6) Tool bits cannot chatter and they can take heavier cuts with higher speed and feed. (7) Roughing and reverse finishing cuts can be made without adjustment of the tool holder. (8) The tool bit can be removed for grinding or renewal and replaced in the holder at any desired position without disturbing the adjustment of the holder in the tool post.

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Advantages offered by the cut-off tool holder (as shown in Fig. 1) are said to be: (1) The cut-off blade is held securely vertical by a clamping pin at the top which is accurately machined to a V-groove at the bottom. The blade is positioned horizontally and parallel to the base of the holder. (2) The clamping pin engages a considerable portion of the blade, holding it to a true cutting position regardless of side pressure imposed on the blade. (3) Pressure is evenly distributed on the blade without undue strain at any point. (4) The method of holding permits use of a shorter blade, making possible the use of a greater portion of the original blade This prevents chatter or any lengths. undesirable movement of the blade, making the holder desirable for work requiring close precision. (5) The blade can be taken from the holder and replaced without changing the adjustment in the tool post. (6) It is being produced for both engine lathes and turret lathes.

These new tool holders augment the company's production of standard car-







A GOOD LOOK

JOSEPH B. FAKES & COMPANY

1415 Etowah Ave.

Royal Oak, Mich.



PLASTIC MAGNIFYING GLASS
A Business Reminder They Will Remember.
Imprinted With Your Firm Name or Without.
Send 50 Cents for Sample.

hide-tipped single point tools and carbide-tipped face mills, shell end mills and side mills.

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Ajax-Hultgren Equipment for Sodium Hydride Descaling and Desanding

To accomplish descaling and desanding of ferrous castings and forgings the Du-Pont Company has developed a process in which a sodium hydride bath is used. When castings or forgings are immersed in this bath, most of the scale and sand is loosened so that when the workpieces are subsequently quenched in a water bath at room temperature, the scale and sand are removed, leaving the metal The process utilizes the Ajax-Hultgren salt bath furnace, made by Ajax Electric Company, Inc., Frankford Ave. at Delaware, Philadelphia 23, Pa. The entire operation is as follows:

The work is first immersed in the bath of molten caustic soda, which contains a small percentage of sodium hydride at 700 deg. F. A vigorous stirring action is caused within the bath by electromagnetic forces which, in turn, are created



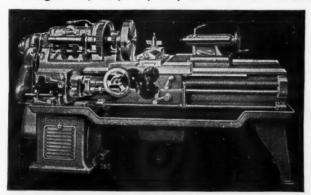
A basket of gray iron castings being lowered into an Ajax Electric salt bath furnace for descaling and desanding. The bath operates at about 700 deg. F. and is heated by the two pairs of closely spaced immersed electrodes shown at the right.

by the patented grouping and design of the closely-spaced electrodes. The bath loosens any sand, scale or foreign material adhering to the surface of the castings or forgings and upon immersing

CINCINNATI GEARED-HEAD MOTOR-DRIVEN

LATHES

Swings: 14", 16", 18", 20", 22" and 24" — Bed lengths 6' and up.



Twelve changes of spindle speeds and thirty-two changes of feed and thread provide adequately for every normal shop require-

Thread range 2 to 28 per inch, feeds .008" to .120" per revolution. Other ranges available on demand.

The usual accessories are included in the standard equipment; others supplied on special order.

Your inquiries will re-receive prompt attention. Our prices and deliveries will be interesting.

BUILDERS OF GOOD LATHES SINCE 1906

CINCINNATI LATHE & TOOL CO.

MARBURG AVENUE, OAKLEY, CINCINNATI, OHIO the workpieces in a water quench, which is the next operation, the loosened material and any caustic which may have been picked up in the reducing bath are removed.

After another water rinse at room temperature, the work is immersed in dilute sulfuric acid for no more than one minute in which any iron particles reduced from iron oxide which might still be adhering to the surface of the material are removed. This operation may be omitted without much loss of efficiency.

The final step is a neutralizing and corrosion retarding bath operating at 200

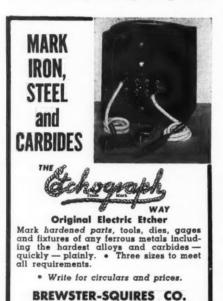
deg. F. This bath is made up of weak sodium cyanide and serves to neutralize any acid remaining on the surface of the work. It also provides protection against corrosive action.

The capacity of the unit shown in the illustration is about 1250 pounds per hour, but depends, of course, upon the size and shape of the work to be treated. The same may be said of the time cycle. Material can remain in the reducing bath for hours without injurious effect to the base metal of the work or the fixtures or baskets. Automatic temperature control eliminates necessity for skilled labor on this operation and working conditions are excellent inasmuch as there are no fumes or detrimental vapors exuding from the units. No hazards are involved such as electrical shock for only 18 volts are required to heat the bath. Maintenance problems are negligible. The equipment requires but little space and can, if desired, be included in a production line as a completely mechanized unit.



Adaptable to virtually any type of multiple drilling or tapping job, the Zagar Gearless Drill Head now being marketed by Zagar Tool, Inc., 23880 Lakeland Blvd., Cleveland, Ohio, can be made to accommodate ½-inch maximum diameter drills on ¼-inch center distances, %-inch drills on %-inch centers, %-inch drills on 1inch drills on 2-inch centers. Spindles can be relocated by reboring the head, which is constructed to operate noiselessly and without injurious vibration, the manufacturer claims.

So as to reduce the weight of the Zagar Gearless Drill Head to a minimum, 85



New York 7, N. Y.

LUERS

PATENTED CUTTING OFF TOOL HOLDERS
PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

J. MILTON LUERS. 12 Pine Street, Mt. Clemens, Mich.
Produced under License Issued by John Milton Luers Patents Inc.

Hudson Terminal Bldg.

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Portable Bryant Thread Gages

Bryant Thread Gages have proved their superiority for bench work... now, the new Portable gage offers fast, accurate inspection of internal threads in large castings, work in the machine, etc., or in any parts where bench inspection may be inconvenient.

The Bryant Portable Thread Gage is so accurate that it can be used to check master gages, and on production work it will check threads all over in a few seconds. It is 4 to 5 times faster than plug gaging. Retracting gage segments eliminate threading the gage into and out of threaded holes — they prevent wear — on Class 4 and 5 fits, selective assembly is possible by classing threads according to indicator readings — pilots on back of thread segments mean rapid, catchless insertion and removal of the gage — there is no chance of cross threading.

The fastest, cheapest, most accurate method of inspecting threads is the Bryant method — it is the only method for visually indicating the size of internal threads. Write for complete details.



Perfect for inspecting throads on large pieces that cannot be moved conveniently to the inspection department.



Allows checking of threads in the work in the machine.



Eliminates threading of gage into and out of threaded holes.



Four or five times faster than plug gaging.



Gives overall inspection in a few seconds—at a glance.



Master gage accuracy transferred quickly to production parts.

BRYANT



BRYANT CHUCKING GRINDER CO.

SPRINGHELD, VERMONT, U. S. A.

June, 1946

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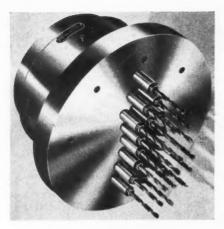
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MODERN MACHINE SHOP

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Zagar Gearless Drill Head

per cent of the unit is made of aluminum. Shafting and all moving parts are made of hardened and ground steel. An ample bronze bearing surface is provided for the thrust of each drill. Moreover, the unit is equipped with ball or roller bearfriction bearings being used at all critical points. A generous flow of oil is provided to the head by a patented automatic oiling system, oil being sealed in effectively by Neoprene rubber or cork seals. Nox-Rust Rust Remover

ings to assure long, useful service, anti-

The Nox-Rust Chemical Corp., 2429 S. Halsted St., Chicago 8, Ill., has developed rust remover which is said to be scientifically compounded to wet metal thoroughly, dissolve rust scale rapidly and remove it completely, and to be relatively non-corrosive to steel even under conditions of long exposure. According to the manufacturer, the product is particularly effective in removing rust from precision bearing and machined surfaces without affecting critical dimensions. Ordinary rust can be removed in a matter of seconds with the material, which leaves no perceptible etching or discoloration of surfaces, it is claimed.

Nox-Rust Rust Remover can be applied by the brush, spray, or dip method, however, because of its long life and rapid action in otherwise inaccessible crevices, the product is said to be most economically employed in connection with the dip method. Specific applications for the material include the removal of rust from castings, steel stock, fabricated parts, hand tools, periodically idle goods, and items exposed to weathering

during storage.

"Powder Weld" System

Equipment for welding, brazing, or surfacing with infinite compositions of powdered materials is announced by the Powder Weld Co., 419 Kent Ave., Brooklyn, N. Y. Known as "Powder Weld," the equipment consists of a torch made in the general outlines of an ordinary welding torch but having a special patented nozzle and 16 independent controls, many of them at the handle of the tool; a control box with air and gas pressure regulating valves; and a canister from which powdered materials are fed through the flame. The flame is generated and controlled by preselected combinations of gases and air.

The Powder Weld System features completeness of control over all operating conditions, thus enabling an operator to achieve precise control of the amount of flux to be used with the metal or alloy;





Standard Size Dowel Pins from 1/8" to 1" diameter and from 3/8" to 6" length supplied in .0002 and .001 over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

SCHULTZ & ANDERSON CO.

109 Edison Place, Newark 5, N. J.

accurate control of the amount of the mixture used, per minute or per inch of weld or braze; accurate control (at the torch handle) of the flame temperature and atmosphere by regulating the amount of fuel gas-oxygen mixture and the addition of processing gas around the flame as desired; accurate control of the temperature of the metal, alloy, plastic, or other material projected, employing the controls above mentioned; and accurate control of the temperature of the target, or work surface, by increasing or decreasing the amount of flame and propor-

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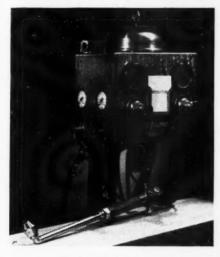
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"Powder Weld" System

tioning the projecting gas (and material) and the processing gas.

Typical applications for which Powder Weld is described as being suitable are hard facing, surfacing with plastics or synthetic enamels, brazing with powdered alloys, welding with powdered metals, rod welding with projected fluxes, controlled atmosphere welding, conventional torch and rod welding, and metal spraying of all kinds.

Ex-Cell-O Drill Chip Breaker

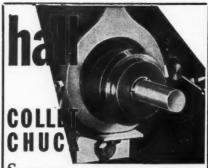
An improved drill chip breaker which is said to break the chip at each revolution of the drill is now being introduced by the Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 6, Mich. In use, the unit



GITS BROS. MFG. CO.

1845 South Kilbourn Avenue • Chicago 23, Illinois





SPEED UP production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

Two-inch capacity, now only \$145 One-inch capacity, \$95 Round, square or hex collets, plain—serrated

HALL MANUFACTURING COMPANY 622 Tularosa Drive • Los Angeles 26, Calif.



is designed to break chips into uniform, small pieces that are easily carried up the flutes of the drill where they accumulate around the mouth of the hole.

The Ex-Cell-O Drill Chip Breaker can be used vertically, horizontally, or at any angle at which the housing can be kept stationary while the drill rotates. An



Illustration showing manner in which drill chips are broken using Ex-Cell-O Drill Chip Breaker

arm is provided to prevent rotation of the housing. Where space permits, the chip breaker can be used in multiple spindle heads.

Webber Angle Gage Blocks

Said to be accurate to within 1/5, 184,-000 part of a circle, the angle gage blocks now being manufactured by the Webber Gage Co., 12899 Triskett Rd.. Cleveland 11, Ohio, are designed to yield any angle from 0 to 103 degrees—a total of 370,800 angles—in steps of one second of an arc. Working surfaces are optically flat and blocks are wrung together in the same manner as with ordinary gage blocks. Two or more angle gage blocks may be wrung together to produce any angle in degrees.

The blocks are furnished individually

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Welded tubing for chrome plated goods, furniture, baby carriages, bicycles, automotive and aircraft parts and the like, must have superlative high finish: Weld must be absolutely perfect, as even minute porosity causes flaws in plating: I.D. must show no flash (inside mandrels are used to make bends): It must have strength and workability for expanding, flanging or bending.

The Gaychrome Company, Worcester, Mass., insist on such rigid specifications in the "Furniture Quality" tubing they produce for manufacturers of steel tubular products. That is why this completely equipped Yoder M2 Cold-Roll Forming Resistance Weld Tube Mill, was installed in their fine plant addition. With it Gaychrome is producing high finish tubing in 5/8", 3/4", 7/8", 1" and 11/8" O.D. and 14, 16, 18, 20 and 22 steel gauges, at up to 100 feet per minute.

This is typical of Yoder installations of all kinds of special metal working production machinery. Let us send you bulletin G 451 cataloging all Yoder products.



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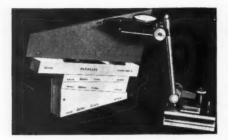
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Webber Angle Gage Blocks in Use

or in three sets: Set No. 14-A with range of 0 to 103 degrees in one-second steps, making a total of 370,800 angles; Set No. 10-A with range from 0 to 103 degrees in one-minute steps, making a total of 6.189 angles; and Set No. 6-A with range from 0 to 103 degrees in one-degree steps, making a total of 103 angles.

New Books

The Foreman and the Veteran, By Ted Handelman. Published by National

TOOLS, BLANKS, and MILLING CUTTERS

LATROBE, PA.

Gar Gast, Accurate

Metal-Cutting

Foremen's Institute, Inc., Deep River, Conn. 32 pages, 41/2 x 63/4 inches. Heavy paper cover. Price, 25 cents.

For foremen, supervisors, and department heads, this small digest-size manual provides concrete suggestions on the handling of the various situations arising in foreman-veteran relations. Written by an ex-sergeant in the U.S. Army where he served as a correspondent and writer for the Army newspaper "The Stars and Stripes," the manual includes the following contents: An Opportunity for You; Three Types of Veterans; Six Changes You Need To Watch For; Six Traits You Can Profit From: Some Facts About Psycho-neurosis; The First Impression; The Follow-Up; and Counselling the Veteran Worker. Four memo pages are provided at the rear of the manual to enable the foreman to keep a record of the veterans in his department.

Shop Terms. Prepared by The Department of Education, International Business Machines Corporation. Published by Syracuse University Press, 920 Irving Ave., Syracuse 10, N. Y. 120 pages, 5½ x 8½ inches. Illustrated. Heavy



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Designed to meet the needs of industrial workers for a comprehensive and authoritative reference manual of shop terms which is compact enough to be carried in one's pocket, this book includes the terms encountered in manufacturing plants where the usual types of machine tools are operated and mechanical and electrical devices are assembled and inspected. All terms are defined simply and most of the definitions This latter feature is are illustrated. especially helpful to new workers by enabling them to learn the purpose and use of many objects which have been seen in the shop but whose names and functions may not be familiar.

To assist in the pronunciation of many terms, a guide to pronunciation is provided at the rear of the book. Also provided is a complete set of tables for the calculation of feeds and speeds in milling and turning operations. Moreover, the book contains a four-page table of trigonometric functions to assist in the solution of many shop problems.

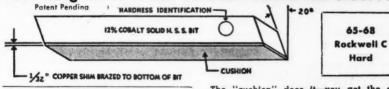
Job Evaluation Methods. By Charles Walter Lytle. Published by The Ronald Press Co., 15 E. 26th St., New York, N. Y. 329 pages. Cloth binding, board covers. Price, \$6.00.

In this book, an endeavor has been made to answer various questions concerning job evaluation methods in such a way that the reader may obtain a full grasp of the subject and know how to apply this knowledge to obtain results. In addition, the book includes a brief discussion of merit rating of individuals insofar as it relates to job evaluation.

Throughout the book, the author has kept in mind the user who wants to explore the field thoroughly, learning first the principles and fundamentals and then in detail the exact ways in which to devise, set up, and successfully operate a plan. Applications to office and supervisory positions, where additional factors encountered, are also included. Special attention has been given to the development of workable rate structures. a subject about which difficulty has been experienced in obtaining full information.

Liberal use of forms, tabulations, charts presenting graphically the setup of rating curves, and illustrative case material from well-conceived and successfully operating installations offer the reader opportunity to grasp and visualize the whole subject and proceed safely with his own plans, well grounded in the re-

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1/2	1/2	4	2.16	2.11	2.06	
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quirements. The analytic approach and the thoroughness of treatment attempted should, it is believed, adapt the book for use in commercial or graduate courses in colleges of engineering and of commerce, particularly in those where attention is given to the activities growing out of the broad field of industrial and personnel relations.

"Job Evaluation Methods" includes 13 chapters which are headed as follows: A Minor Function Becomes a Major One; Determining Policies and Organiz-ing; Methods and Techniques; Choosing Job Characteristics; Selling the Plan;

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Plastics Mold Engineering. By J. H. DuBois and W. I. Pribble. Published by The American Technical Society, Drexel Avenue at 58th St., Chicago 37, Ill. Illustrated. Cloth binding, board covers.

Price, \$7.00.

This book has been prepared with the intention of describing the design of the important types of molds and indicating their use. Construction methods commercially employed are explained, since best results are said to be obtained when molds are designed for toolroom equipment that is widely available. Certain of the twelve chapters comprising the text deal with individual types of molds and specific molding processes. In these chapters, the procedure and calculations used in achieving the final mold design are indicated.

Raw materials and product design considerations of great interest to the mold designer are discussed at appropriate length. A short chapter describes the various raw materials used for mold parts and another deals with the maintenance and repair of molds. Reference tables useful to mold designers are included so as to provide both the student and designer with essential data.

"Plastics Mold Engineering" will, it is believed, be particularly helpful to those who are just entering the plastics field and wish to make a serious study of the various phases of this important science. The twelve chapter headings of the book are as follows: Plastics Molding: Plastics

H.S. Drills, Milling Cutters, Lathe Tools, H.S. and C.S. Taps and Dies, Drill Chucks, Lathe Chucks, Tailstock Turrets, Bed Turrets, Files, Special Taps and Dies, etc.

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Product Design: Types of Molds: Tool-Making Equipment and Methods; Materials for Mold Making; Designing and Drafting Practice; Compression Molds; Transfer Molds; Injection Molds; Cold-Mold and Extrusion Die Design; Special Fixtures; and Mold Sampling and Maintenance. An appendix, list of abbreviations and symbols, and index are provided at the rear of the book.

Time Study and Motion Economy. By Robert Lee Morrow. Published by The Ronald Press Co., 15 E. 26th St., New York, N. Y. 338 pages. Cloth binding, board covers. Price, \$5.00. Written for those who find it impor-

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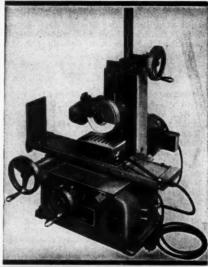
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tant to know the fundamentals and the advanced techniques of time study and motion economy, this book incorporates a method of presentation that follows from the author's consulting and training experience. The aim has been to make the subject matter plain and easy to understand. Illustrations and cases are liberally employed, and these are simple and short but complete, showing exactly what is done without requiring the reader to follow through lengthy, complicated procedures.

The book tells not only "what" but "how" so that methods may be clearly comprehended and readily followed in practice. The ways to study operations, take observations, and completely compute the data to obtain sound standard times are definitely and fully described. All processes discussed in the book-with the exception of the new synthetic leveling-have been regularly used and practiced by the author or others in many types of manufacturing plants. The author has specially emphasized the modern constructive attitude that the worker's stake is his job entitles him to a complete explanation of time and motion study practice so that he can then have confidence in the findings of time study

Believed to be well suited to serve as a text for courses in the field of time study and motion economy, the book comprises 23 chapters which are headed as follows: Human Problems of Methods Change; Operation Analysis; Flow Process Charts and Diagrams; Right and Left-Hand Process Charts; How to do More Work with Less Effort; Suggestion Plans; Analysis Techniques; Fundamentals and Uses of Time Study; Time-Recording Equipment; Time Study Procedure; Terms Used in Time Study; Leveling and Rating; Synthetic Leveling;



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Fatigue in Industry; The Interruption Study; The Ratio-Delay Study; Final Computations; The Standard Data Method; Organizing and Training Time Study Personnel; How to Secure Employee, Union and Management Cooperation; Straight-Line Production; Automatic Machine Studies and Work Assignments; and Feeds and Speeds for the Cutting of Metals.

correctly designed recess, the manual contains over 100 drawings of packings design and application, as well as many photographs showing successful installations, causes of packings failure and their remedies, and so on. In addition, the manual includes approximately 50 timesaving reference tables.

Mechanical Packings Manual. Published by Graton & Knight Co., 356 Franklin St., Worcester 4, Mass. 336 pages. Genuine leather covers. Price, \$4.50.

The primary purpose of this manual is to outline the basic principles which influence packings life and resultant machine performance. It includes information on the selection of mechanical packings, their application, and the design of adjacent parts in hydraulic or pneumatic equipment. Both leather and synthetic rubber packings are discussed, and operating conditions governing the selection of material are enumerated.

Adequately indexed to lead the design engineer from the selection of the proper type of packing to its installation in a

New Films Miller Operation Film

W. H. Nichols & Sons announces a 16 mm. sound color movie entitled "The Miller That Uses Its Head." An analysis of the Nichols Hand Miller from the tool engineer's and tool designer's point of view, the film, which has a running time of 23 minutes, shows many different kinds of tooling and fixture design, all the way from simple stock fixtures to completely automatic fixtures, such as one for planing a double-start helix on a fuel injector plunger.

Inquiries for showings of the film should be addressed to the Nichols-Morris Corp., 44A Church St., New York 7,

New York.

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DUSTKOP: The Least Costly, Quickest Way To Stop Dust.

Grinding Films

A series of 16 mm. Kodachrome motion pictures with sound, entitled "Lessons in Grinding", is now being made available to industrial apprentice schools, foremen's groups, vocational schools, colleges, and universities wherever machine shop practice is being taught, by the Norton Co., Worcester 6, Massachusetts.

The series comprises seven films having running times ranging from 14 to 30 minutes, the films being made short purposely so as to encourage discussion of the subjects following their showing. A film on cutter sharpening is devoted to the setting up and sharpening of milling cutters, reamers, and other commonly used tools. A film on the cylindrical grinder covers operating levers and controls; balancing, truing, and mounting the grinding wheel.

In a third film, the surface grinder is the subject, with types of machines, classes of work, surface finishes, and the "what, why, and how" of operation illustrated. Another film provides detailed instruction in the handling, storage, and use of grinding wheels. The correct procedure in grinding different types of carbide-tipped tools is illustrated in a fifth



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The brass cylinder plugs require drilling and countersinking as indicated on the drawing. The Kingsbury Fleximatic that does this complex job is assembled from nine standard Kingsbury drilling-head units and a standard Kingsbury base. The main indexing turret has ten duplicate work holders, nine of which are in working position while the operator loads and unloads the tenth. This means that the time of the longest single operation is the time to produce a finished piece.

The Kingsbury Fleximatic method is a means of performing automatically several machining operations accurately and quickly during a single chucking. It means that production of multiple machined parts can be increased, without overburdening operators, while production costs drop to a new low. Because Kingsbury Fleximatics are made up of standard units, initial cost is surprisingly small for a special-purpose machine tool.

Are you interested in producing more parts, faster, and more profitably, through combined operations? Send sample parts or blueprints to Kingsbury today. Our engineers will be glad to submit cost and production figures — there is no obligation.

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KINGSBURY FLEXIMATIC

a special purpose mechine for constinue internation operations during a single chucking the result of Kingshury engineering ability in the use of low cost standard Kingshury itiliting and tapping heads on standard (Ingshury basse.

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film in the series, while a sixth film is devoted to grinding wheel markings. The seventh film in the series depicts safe and unsafe practices in the handling and use of grinding wheels.

Porter-Cable Wet Belt Machining Film

A film on the wet belt machining method of surfacing, grinding, and stock removal is now available to engineers, design and production executives, planning and methods engineers, toolroom and die room foremen, and all other interested members of the metal industry through the Porter-Cable Machine Co., 1714 N. Salina St., Syracuse, N. Y. The film, which is sent free upon request for private or group showing, is a 16 mm sound, black-and-white visual presentation entitled "A Machine of the Age." It can be projected from any standard 16 mm. machine and has a running time of 11 minutes.

"A Machine of the Age" traces the development and perfection of the wet belt machining method from its earliest dry belt forerunners to its acceptance as a machine tool used on production orders

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running into hundreds of thousand pieces as well as its application to single piece operations in tool and die rooms, repair and maintenance and other departments. Case histories of savings and increased production resulting from this method are presented.

The film shows how surfacing, grinding, and stock removal operations are performed. It is complete with technical information on the amount of stock removable, kind of finish attainable, and tolerances held on such various materials as ferrous and non-ferrous metals, glass, plastics, and ceramics.

Specific applications for the wet belt machining method as shown in the film include removing risers, flashings, and parting lines from cast materials; surfacing large, flat areas to close tolerances; and chamfering, edging, rounding, and cutting radii on single pieces.

Original Gilbreth Films

Feeling that a summary of the 250,000 feet of 35 mm. pictures which Frank B. Gilbreth filmed between 1905 and 1924 should be available to universities and also to business and industrial organizations because of their unique value in presenting the historic background of motion study and the outstanding contribution of the father of motion study, the Chicago Chapter of the Society for the Advancement of Management, 426 S. Maple Ave., Oak Park, Ill., announces that copies of "The Original Films of Frank B. Gilbreth" are now available after five years of intensive preparation. Some of the more significant studies which the film includes are: The Brick Laying Project which Led to Motion Study; Factory Operations which Led to the Development of Motion Study Prin-ciples; Frederick Taylor's Pig Iron Carrying Experiment; and A Study of Skill by the Cyclegraph Technique.

The film is being offered by the Society as a management service. However, to cover the expenditure that arose in preparing same, a copy of the 1,200-foot 16 mm. silent film with reel and metal container is available for \$75.00 (including shipping charges in the U. S.).

New Shop Literature

Sellers Carbide Grinder for grinding milling cutter tool bits is illustrated and described and covered as to specifications in a four-page folder released by William Sellers & Co., Inc., 1600 Hamilton St., Philadelphia 30, Pa. Copy free to execuives upon request,

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"Surface" Prepared Gas Atmospheres. Complete information on the preparation and applications of the various types of atmospheres used in the heat processing of metals is contained in a 12-page bulletin issued by the Surface Combustion Corp., Toledo 1, Ohio. In addition to a discussion of the "why, what, and how" of prepared atmospheres, the nature of the constituents of the various atmospheres, the effect of each, and the combinations used are described. This information is summarized in a two-page table which indicates the numerous applications of the atmospheres in such heat-treating operations as carburizing. carbon restoration or "skin recovery" of surface-depleted steels, dry cyaniding, bright annealing of stainless steels, and so on. The costs of producing the various atmospheres and the types of equipment available to produce each type of gas are also given. Copy of Bulletin SC-129 free upon request.

Ohio Knife Products Catalog. A 60page loose-leaf catalog descriptive of its complete line of products has been prepared by The Ohio Knife Co., Cincinnati 23, Ohio. Beginning with a discussion of the history and background of the company, the catalog provides illustrated and descriptive data on the complete facilities of this firm for producing cutting tools, hardened ways and gibs, machine knives, and so on. Following this are illustrations and descriptions of the various cutting tools produced, including form tools, cut-off tools, and special tools, both carbide and high speed steel. Different types of hardened ways and gibs are next pictured and described, after which various miscellaneous products are treated, including centerless work rests, straightedges, parallel blocks, surface plates, and rolls. Numerous types of machine knives are covered in the latter pages of the catalog, with several helpful tables on carbon and alloy steel weights, decimal equivalents, hardness conversions, and metric conversions rounding out the publication.

Copy of the catalog is available free to interested mechanical executives and engineers addressing requests on their

company letterheads.



Michigan Cone - Drive Gear Sets, A 16-page 81/2 x 11-inch catalog describing its complete line of standard stock Cone-Drive Gear Sets has been issued by the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. The catalog lists various sizes of gear sets ranging from a center distance of 2 inches to a center distance of 18 inches, and in ratios ranging from 5:1 to 70:1. The standards cover a range of from 0.06 h.p. at 100 r.p.m. to 800 h.p. at 2,400 r.p.m. based on Class 1 service. Drawings giving all dimensions for pinions, gears, and spiders are included. Standard gear set tool charts and horsepower ratings are also provided. Copy of Catalog No. 700 free upon request.

"Clevelands in the Modern Production Flow" is the title of a pictorial bulletin in three colors published by The Cleveland Worm & Gear Company describing the applications of worm gear speed reducers to various types of mixing and grinding equipment. Subtitled "Mixing and Grinding," the bulletin contains photographic illustrations featuring installations of worm gear units on equipment used by eleven leading industries for the processing of their materials. Specific "mixing and grinding" operations include crushing, screening, agitating and polishing. Each worm gear application is briefly discussed, and each photograph is accompanied by a facsimile blueprint detailing the drive application shown.

Standard Cleveland drives are illustrated in connection with typical installation views, with a description of the Speedaire fan-cooled unit which the company brought out some months ago also included. The bulletin may be obtained by addressing the manufacturer at 3277 E. 80th St., Cleveland 4, Ohio.

Thompson Truforming Process. An eight-page folder which provides a complete explanation of the Thompson Truforming Process for crush form contougrinding on a high production basis has been prepared by The Thompson Grinder Co., Inc., Springfield, Ohio. Copy free upon request.

"Testing Coated Abrasives" is the subject of a four-page illustrated bulletin by E. B. Gallaher and published by the Clover Manufacturing Co., Norwalk, Conn. Metal-sanding tests are discussed in considerable detail and reasons for laboratory testing are set forth. Copy of Bulletin No. 3 free upon request.

Cramer Type IE Internal Timer for use in the control of automatic mixers, ovens, plating processes, X-ray machines, and so on, is the subject of an illustrated and descriptive bulletin released by The R. W. Cramer Co., Inc., Centerbrook, Conn. Copy of Bulletin 100C free upon request.

"Case Hardening in 'Surface' Standard Rated Furnaces" is the title of a fourpage bulletin released by the Surface Combustion Corp., Toledo 1, Ohio. The application of pack, liquid, and gas carburizing is covered, and the ideal types of furnaces for the various methods are shown, together with views of casehardened steel parts and actual furnace installations. A table of pot recommendations, including pot materials, maximum bath temperatures, and type and composition of salt baths, is also provided. Copy of Bulletin SC-127 free.



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Gilman Jewelers-Instrument Lathe for production or toolroom use is fully covered as to construction features and specifications in a four-page illustrated folder prepared by the Gilman Engineering Works, Janesville, Wis. Copy free upon request.

Cambridge Surface Pyrometers. A 12page bulletin, No. 194-SA, on portable surface pyrometers for use in plant and laboratory has been issued by the Cambridge Instrument Co., Inc., 3079 Grand Central Terminal, New York 17, N. Y. It illustrates and describes the Cambridge Roll Pyrometer for determining temperature of readily accessible rolls or other convex surfaces; Extension model for similar surfaces in hard-to-reach locations: Mold Pyrometer for mold cavities or stationary surfaces of almost any contour; and Needle model for measuring sub-surface temperature of materials in a plastic or semi-plastic state. Lists of typical applications accompany the descriptions of each model. Among the 33 illustrations are many showing these instruments in use in a wide variety of production operations. Copy free.

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AAF "Roto-Clone" Dust Control. A 36-page bulletin devoted to its line of "Roto-Clone" dust control equipment is announced by the American Air Filter Co., Inc., First and Central Aves., Louisville 8, Ky. The bulletin contains numerous installation photographs, tables, and charts, as well as a discussion of a simplified procedure for designing a Roto-Clone exhaust system. Also included is an explanation of pressure relationships in an exhaust system and methods of measurement.

Copy of Bulletin No. 270-A is available free to mechanical engineers and executives upon request.

Center Scope Products. A 16-page booklet illustrative and descriptive of its line of optical locating tools and accessories is now available from Center Scope Products, 3829 San Fernando Rd., Glendale 4, Calif. The booklet covers in detail the Variable Center Scope which can be used on any machine tool-horizontal or vertical-for use in compensating for runout and in inspection operations. The use of the Variable Center-Scope with a swivel eyepiece is also pictured and described, as well as other auxiliary equipment for Center Scopes, including V-block gages, centering blocks, angle eyepiece attachments, edge blocks, and so on. Copy free upon request.

"How to Select Power Brushes for Manufacturing Operations" is the title of a 24-page booklet issued by the Technical Department of The Osborn Manufacturing Co., 5401 Hamilton Ave., Cleveland 14, Ohio. The contents of this 8½ x 11inch generously illustrated booklet include a four-page treatise on factors that enter into the selection of brushes. Fifteen separate tables provide detailed information on a variety of factors entering into efficient power brushing operation. More than 30 illustrations graphically depict actual power brushing operations and some of the achievements possible with proper brushes and suggested techniques.

Another feature of the booklet is a series of tables which groups various types of Osborn brushes and wheels, providing the brush number, approximate operating face width, wire diameter, brush trim length. and application notes referring to the use of individual models and sizes.

Copy free upon request.

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Immediate Delivery

No. 1 to 60

New High Speed

Long Length

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DRILLS

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No. by GAGE	LENGTH	OUR PRICE NET EACH	
1 to 10	61/4"	\$.90	
11 to 20	53/4"	.80	
21 to 30	53/8"	.70	
31 to 40	51/4"	.60	
41 to 50	41/2"	.50	
51 to 60	31/2"	.40	

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VICTOR MACHINERY EXCHANGE, INC.

251 Centre Street

Phone: CAnal 6-5575

NEW YORK 13, N. Y.

Kearney & Trecker Corporation Catalog No. E-53. Catalog No. E-53, presently issued by Kearney & Trecker Corporation, Milwaukee 14, Wis., is intended to acquaint users and prospective users of milling machines not only with the general scope of "Milwaukee" products, but also with the men and the firm behind

those products.

Beginning with a short history of the company, and a resume of the important developments that have been engineered by this company since its incorporation in 1898, the reader is taken on a "paper" trip through the Kearney & Trecker plant, from which he is able to gain some idea of the extent of the company's facilities and the high quality of its equipment and methods. Following this section is a section devoted to illustrations, specifications, and dimensions of the various types and kinds of machines made in this plant. A section devoted to the engineering of special milling machine attachments and accessories is included.

Not only are the machines illustrated, but close-up views of various milling set-ups presented to show the wide variety of jobs that are being handled on Milwaukee horizontal and vertical milling machines equipped with the ingenious and highly efficient fixtures for which this company is noted. The book closes with a section devoted to jig boring machines and machines especially de-

signed for toolroom work.

A copy of the book is available to any mechanical engineer or executive,

Logan "Air-Draulic" Cylinders. A 16page illustrated catalog announcing its new standard "Air-Draulic" Cylinders and containing helpful engineering data is now being offered by the Logansport Machine Co., Inc., 901 Center Ave., Logansport, Ind. The Air-Draulic operating principle is clearly described in the catalog, and types of power movement which may be obtained with Air-Draulic Cylinders are outlined. Typical circuits employing different types of control are described and illustrated with diagrams. In addition, complete installation instructions are provided, and optional accessory equipment is described. Copy free upon request:

Heim Unibal Spherical Bearings and Spherical Bearing Rod Ends are the subject of a 16-page catalog published by The Heim Co., Fairfield, Conn. Com-mencing with a history of the company, the catalog provides descriptive, illustrated, and complete tabular information on the various series in which the bearings and rod ends are offered. In addition, engineering data are provided at the rear of the catalog. Copy of Catalog No. 11 free upon request.

Macklin Toolroom Grinding Wheels are the subject of a 32-page illustrated catalog published by the Macklin Co., Dept. MMS, Jackson, Mich. The catalog contains suggestions and recommendations for toolroom and surface grinding jobs, including those involving the grinding and sharpening of milling cutters, reamers, hobs, broaches, thread chasers, taps, twist drills, gages, Stellite tools, lathe and planer tools, dies, and cemented carbides, as well as various phases of surface grinding. Moreover, the catalog presents helpful illustrated, descriptive, and tabular information on cut-off wheels and mounted points, in addition to the numerous types of toolroom and surface grinding wheels produced by the company. Copy of Catalog No. T-45 free upon request.

High Speed Cutting Tools

· Special high speed circular, dovetail, flat form and special tool bits. . Design and manufacture of small machines, jigs, gages, dies and experimental parts calling for greatest accuracy. . Regrinding and salvaging high speed flat form, special bits and small flat broaches.

> Write for quotes. REPRESENTATIVE WANTED.

LINCOLN PARK MANUFACTURING CO. 3304 Dix Road Lincoln Park, Mich.

MACHINE VISES For TOOL-ROOM or Production.



Six sizes, 3" to 12". Many exclusive features. You see them everywhere. Write for circular.

J. E. MARTIN MACHINE WORKS Springfield

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Just imagine grinding parts flat within six millionths of an inch and with so fine a finish that they can be "wrung" together. Such superfine finishes to meet exacting requirements of modern industry, are possible with DoALL Precision Grinders.

Hydraulic Operation

Doall Grinders are "liquid" powered for extremely smooth, vibra-tionless performance. No Backlash! The extra weight of the scientifically stabilized castings is distributed throughout the machine. Only DoALL has a massive one-piece base and column support to assure utmost rigidity. All ways are handscraped. Lubrication

Fingertip Control

Recessed switches, handwheels for feed and other controls, all within easy reach, provide ease of operation. Hydraulic action can be changed instantly to complete manual control.

There's no need to purchase accessories separately when you can get them all right with the DoALL grinder as a completely packaged unit.

Seeing the DoALL Grinder operate will be a revelation in what a surface grinder should be and do. Write for 20page circular or phone nearest DoALL Service Store for demonstration.

The DOALL OF

HYCC Tool Steel, a high carbon highchromium tool steel particularly adaptable for the making of blanking dies and punches from which long production runs are required, is covered as to typical applications, critical temperature, forging, annealing, hardening, tempering, and so on, in a data sheet now available free from the Crucible Steel Company of America, 405 Lexington Ave., New York 17, New York.

"Cone-Drive Gearing at Work in Materials Handling" is the title of an eightpage bulletin now available from the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. "Action" photographs, combined with explanatory diagrammatic sketches, illustrate the considerable variety of equipment for materials handling in which Cone-Drive double enveloping gearing is now being used to advantage. In addition, a brief historical background of Cone-Drive development is given and design and application principles of Cone-Drive gearing are clearly brought out by text and line drawings. Copy of Bulletin No. 742 free upon request.

H. LEWTHWAITE MACHINE CO. FRONT LEVER BENCH PUNCH Capacity 7/16" hole through 1/4" steel or equal Round, square, flat, and oval shaped punches and dies stocked Send for circular illustrating and describing this machine. 317 East 47th St., New York 17



Harris Model K Hydraulic Baling Press for baling sheet metal clippings from press shops is illustrated and described in a four-page folder now being distributed by the Harris Foundry & Machine Co., Cordele, Ga. Copy free.

Tennant Model J Industrial Floor Machine for removing incrusted grime, dry cleaning, sweeping, polishing, burnishing, and sanding industrial floors is the subject of an illustrated two- color bulletin now available free from the G. H. Tennant Co., 2530 N. Second St., Minneapolis 11, Minnesota.

Simmons 20-Inch Micro-Speed Shaper. which is said to be equally suited to the demand of heavy production work and to the exacting requirements of toolroom work, is covered as to construction features, dimensions, and specifications in a four-page illustrated bulletin prepared by the Simmons Machine Tool Corp., N. Broadway, Albany 1, N. Y. Copy free upon request.

Gleason No. 16 Quenching Press, product of the Gleason Works, 1000 University Ave., Rochester 3, N. Y., is fully illustrated and described as to construction features, operating cycle, and so on, in an eight-page bulletin released by this firm. As mentioned in the bulletin, the press can be used for hardening bevei, hypoid and spur gears, liners, bearing races, discs, and various other parts of symetrical or non-symetrical shape. Copy free upon request.

"Gauging Problems" is the title of a 32-page pocket-size booklet published by the Abdite Gauge Co., 5405 Oakman Blvd., Dearborn, Mich., in which an attempt has been made to present a brief history of the men now heading the Adbite Gauge Company, together with a few sidelights on the facilities offered by this modern well-equipped plant. In addition, the latter pages of the booklet include A. G. D. Standards which the gage user should find very helpful in his regular work.

Copy of the booklet will be sent free of charge to individuals making requests on their company letterheads.

SPECIAL LATHE BUYS!

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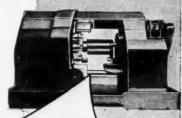
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EY	TYPE	SIZE OR CAPACITY	AVAILABLE NOW
9	Heavy Duty Mfg. and Fred. Multi-teal, not automatic	Up to 30°	788
9	Single Spindle, Herizantel, Pletten type		43
•	Single Spindle, Herizentel, Turest type		280
0	Multi Spindle, Nertzentel	4 to 8 Spindles	1,510
•	Multi Spindle, Vertical	4 to 8 Spinding	202
•	Aute. between senters chucking, heriz, single spindle	All sizes	2,036
•	Speed Lether	1/6 to 5 HP	2,078
0	Furrest Lethius	All sizes	144



GOVERNMENT-OWNED SURPLUS PRODUCTION EQUIPMENT



An immediate source of additional or more modern production equipment is the large inventories held by the War Assets Administration. Built for war, basic machine tools such as these lathes are ready to serve in peace. Hundreds of items are available now, priced for quick sale. You can do yourself and America an important service by putting this idle production capacity to work as quickly as possible. Check this and the following three pages carefully and act at once to secure equipment you can use profitably.

Meavy Buty Mfg. end Prod. Multi-teel Lethe (nez extemetis). These heavy duty production tools are evallable in quantity in Deltroit, Chicago, Soston, and New Orlean offices of War Assats Administration. For details contect any W. A. office.

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294	-			w	-			

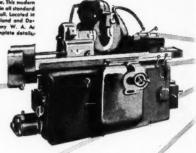
To War Assets Administrations Please send me information on the types of lathes checked at the right. I am also interested in the availability of the following types of lathes not listed in this advertisement: Firm..... City.....State.... For War Assets Administration address, see 4th page of this advantament. 277-4

LATHE CHECK LIST

(These key letters correspond to the ma-chines listed in the table above. Simply check those in which you are interested.)

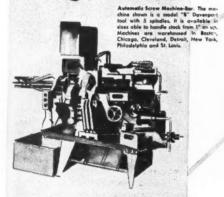


Ratemet Thread Geinder. This modern equipment is available in all standard sizes, 63.5 methines in all. Located in Beston, Chicago, Cleveland and Detroll. Simply contact any W. A. As Regional Office for complete details;

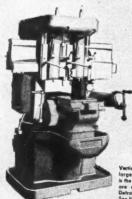


Beach Drill. Sendlive, single spindle, round column types, available up to 22' swieg in capacity under ½", from 16" to 24' swing in capacity from a 16" to 24' swing in capacity from ½" to 1". Located in Besten, Birmingham, Clavaland, Charlotte, Detroit, Minnespolis, New York, Oklohowa City, Philodelphia, San Antonia and St. Lovis Regional Offices.

External Cytinder Grinder—Pissin. This is a Norton model but other makes are also available. Total inventories in Boston, Chicago, Cleveland, Detroit, Philadelphia and St. Louis amough to 1730 machines.









Vertical Prefiter — 2 spindle type. Typical of a large number of 1, 2, 3, and 4 spindle machines the milling machine are machines are available in Boston, Chicago. Cleveland, Detroit, New York and other Regional Offices. See list (next page) for other types also in stock.

Merizontal Sering, Drilling and Milling Machines. Here is another illustration of a machine typical of on emite class of machine tools available in large quantity at many W. A. A. Regional Offices, in standard makes and sizes.

*KE

right listing conto Region

Jun

BASIC TOOLS

GOVERNMENT-OWNED SURPLUS PRODUCTION EQUIPMENT

(second in a series of 4-page advertisements designed to inform industry of available machine tool surpluses)

Here, by the hundreds, are the tools you need to modernize your production and establish new enterprises—available now at low cost—at a time when a war-devastated world is exerting the biggest demand for goods and services ever known. You owe it to yourself, your organization, and your fellow men to put this productive capacity to immediate use. So check this list carefully, Find out which of these basic tools will help you solve immediate production problems. Then clip and mail the expediting coupon to the nearest War Assets Administration office listed on the next page. War Assets Administration is a government agency specially created to help you apply War Surpluses to post war needs.

CHECK LIST OF SPECIAL MACHINE TOOL BUYS!

Here are a few of the many thousands of machine tools now available through War Assets Administration.

KEY*	MACHINE (function)	TYPE	SIZE OR CAPACITY	Available New
A-	Minders	Race Radius—External Race Radius—Internal Conteur Profile		118 72 78
D-	Scrow Machine	Auto—Bor—Single Spindle	Un to 155° cm.	1978
8-	Serew Machine	Auto-Bar-Five	All sizes	1818
	Serow Muchine	Spindles Auto-Bar-Eight		10.0
		Spindles	11/4" and Over cap.	380
-	Engravers	Pantagraph — 2 Dimensions		70
-	Haners	Internal—Horizontal	Under 6º Sora	178
1		internal-Vertical		129
	Lapping	Flat Surface Only	24" Diom, les plats	107
-	Polishers & Buffers	Floor Type	35 to 10 H.P.	1479
8-	Lathes	Speed Type	Up to 3 H.P.	1490
M-	Saves	Circular Cut-off		210
N-	Abrasiva Machine	Soit Drom & Disc	1	510
0-	Abrasiva Cut-off		1	112
-	Topping	Vertical—1 & 2 Spindle		457
9-	Tapping	Horizontal—1 Spindle	1	259
	Die Threeding	Buit Rolary-1 Spindle	1	113
3	Contoring Pointing, Chamforing	Dauble End Hortzantel	1	1118
-	A Burring			141
22-	Geor Shapers	External & Internal	Up to 40° Diam.	
- (Spor—External only	XPEDITING	COUP
77-		Spor & Holloul-1988	PREDITING	Con
99-		Saur & Holical—	KPEUIIII	
RR-		Spor & Holical— 16	wood to c	OUTBLAS
88-	Gear Cuttory	Sevel Type not inc. U	se this coupon to co y key letters the ma	chines
11-	Geor Tooth Finisher	Plainer Type Str. 5	y key letters the many key key letters the many key key letters the many key key key letters the many key key letters the many key key key key key key key key key ke	tegional
		Generating Type Grinding	nearest W. A. A. determine in advant	ce our sto
UU-		Formed Wheel Types	determine in advant	orm you
AA-	Geer Yeath Eupper	External only &	german and inte	

*KEY letters are provided for your convenience in filling out the coupon to the right. They do not refer to any other listing of surplus property. If used in contacting War Assets Administration Regional Offices by letter, wire or phone, please refer to this advertisement.

KRY*	MACHINE (Pension)	TYPE	SIZE OR CAPACITY	Available How
	Shavar	(Not Goar)		104
	Roumer	(Pést RIRs)		816
	Drawing Machine Machinery & Equipment		100,000# and over	21
A	Allied to Primary Matel			
	Forming Machine and			
	Equipment	Pickling	All close	149
	Straight Side Presses	Vertical-Single Action	S to 100 Tona	168
Z-		Vertical-DoubleAction	S to 100 Tons	719
	Plame Culling Machine Hardness Toster	Brinell-Partoble &		1448
-	Commission Leaves	Power		200
cc-		Reckwell-Hannel &		
-		Fewer		439
	Inspection Machine	Magnetic (Magnettux)		-
H-	Balancing Machina	Static Dynamic		-
	Baring, Drilling &	Dynamic		-
	Milling	Hartesstal	Under 3" to 4"	209
1004-	Boring & Turning Drills	Varticul.	Under 94"to 130"Swing	483
8-	Bering Fixed Rell Took			
	MASS	Vertical		
11-	Precision Boring	Hartzentul bridgo-	Under 8" to 14"	488
KK-	(meaning)	Harizontal bridge-	Annual S. 10 14.	198
		double and	Under 8" to 14"	236
u-	Drille	Box calcinn-	Under 16" Cap.	
		gingle spindle	Up to 22" Swing	287
MM-			16" to 1" Cap.	
HN-		Reand column—	16" to 34" Swipen	
		alogie miledine		
00				
لسيال			-ching tools	ino.
- Uline		an follow	wing machine tools	
لسيال		rested in the follow	wing machine tools	444
المستأثار	i am also inte	rested in the follow	wing machine tools	4++
Circle) am also inte	prested in the following lists	wing machine tools	414
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All have shown on this and preceding three pages are offered subject to prior, sele. This surphus property has previously been selectively and offered to prior claimants including Veterans of World War II.

MILLERS



Merizontal Hand-

For this and all the machine tools shown in this advertisement, simply contact your nearest War Assets Administration Office listed below, using the coupon provided. That office will know that large leven-tories of this miller, for example, are available in Boston, Detroit, Ransas City, and New York and how to get one or more

GOVERNMENT-OWNED SURPLUS PRODUCTION EQUIPMENT

These milling machines, and the other surplus machine tools shown on the preceding 3 pages, were productive enough and modern enough to win history's biggest war. They were versatile enough to turn out some of the most intricate weapons of all times. As they stand—some used and some unused—they are the largest untapped source of peacetime productivity and profits in the U. S. today. With them you can modernize and speed up your production or establish new enterprises at lowest cost. And it's easy to do. As a first step in acquiring these machines, simply fill in and mail the coupons on this or the preceding 3 pages.

Harizontal Miller (knee type) These machines are located in quantity as follows \$1; under 28" Table Travel; New York, Sos
\$1; under 28" fable travel; New York, So; ton, Detroit. \$2; 28" to 34" Table Travel
Detroit, Cleveland, Boston. #3; 34" to 42
Table Travel; Detroit, Cleveland, Chicago
and Philadelphia. #4; 42" to 50" Table
Travel; Detroit, Cleveland. #5; over 50
Table Travel, Detroit, Cleveland, Chicago
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Travel; Detroit, Cleveland. #5; over 50"
Table Travel; Detroit, Cleveland, Chicago.
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FREE INFORMATION To War Assets Administration: Without obligation, please send me detailed information on the milling machines	MILLER CHECK LIST (These key letters corre- spond to the machines fisted in the table above. Simply check those in which you are interested.)	Name
checked at the right and on the following types not included in your lish	000	Plem
	8 8 0	Address
	000	City
277-4	000	State

SPECIAL MILLING MACHINE BUYS!

KEY	TYPE	SIZE OR CAPACITY	QUANTITY AVAILABLE NOW
00	Herizontel, Plain, Hand Food	All signs	344
0	Harizontal, Flain, Knee Type	, at nows	2,125
0	Vertical, Universal	#1 to #3	847
000000	Auto Millers	All sizes	458
ā	Bed Type, Plein, Herlz. Spindle	All sizes	2,703
ŏ	Vertical Spindle, standard	All sizes	428
ŏ	Vertical Fixed Bed Profiler	1 and 2 Spindles	847
ŏ	Thread Millers—Universal (non-auto)	\$2" Work Die. and up.	76
0	Thread Millers—Universal (auto)	Up to 20"	238
O	Thread Millers-Chucking (auto)		207
Ŏ	Planetary Milling Machines	6" Work Die. and up	204
ā	Selles Millers		348

WAR ASSETS ADMINISTRATION

OFFICES LISTED BELOW ARE TEMPORABILY IN RECONSTRUCTION FINANCE CORPORATION AGENCIES

Offices located at: Atlanta · Birmingham · Boston · Chartotte · Chicago · Claveland · Dallas · Denver · Detroit Helene · Hauston · Jacksonville · Kansas City, Mo. · Littla Rock · Las Angeles · Lauiaville · Minneopolis Nashville · New Orlsans · New York · Oklohoma City · Omaha · Philadelphia · Pondand, Ore · Richmond St. Lauis · Salt Lake City · San Antonie · San Francisco · Seattle · Spokane · Cincinnati · Fort Worth (Tel. 3-5381) Ampco Aluminum Bronze and Copper Base Alloys. Ampco Metal, Inc., 1745 S. 38th St., Milwauke 4, Wis., has issued a four-page bulletin highlighting its line of aluminum bronze and copper base alloys, specialties, and services. Specialties include resistance welding electrodes, mill products, continuous cast bearing bronzes, Ampco clad metals, pumps, and fabricated assemblies. Services mentioned as offered by the company include the precision machining of castings and forgings made from Ampco Metal and Ampcoloy alloys. Copy of Bulletin 72 free upon request.

Lepel High Frequency Induction Heating Units. Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, N. Y., is now distributing a 32-page catalog of high frequency induction heating units. Illustrated with numerous photographs and drawings, the catalog explains in non-technical language the principal and application of induction heating and its advantages for heat treating, stress relieving, hot forming. brazing, soldering, and melting common and precious metals. It also describes and illustrates numerous applications of induction heating in such operations and provides data on the complete line of Lepel units and accessory equipment. Copy free upon request.

Howard Metal Cleaning and Finishing Catalog. An attractive 48-page catalog containing over 800 photographic illustrations and detailed information on the design and application of metal cleaning and finishing machinery has been prepared by the Howard Engineering and Manufacturing Co., 2278 Buck St., Cincinnati 14, Ohio. Among the types of machines illustrated and described are cabinet type and conveyor type metal cleaners and finishers; monorail washers; rotary washers; small parts washers; tumbling, deburring, and burnishing machines; hot air dryers and ventilators; and solvent cleaners.

A separate section is included on machines of special design, custom-built by the manufacturer to meet unusual requirements. In addition, the catalog provides complete information on the various processes involved in metal cleaning and finishing. Copy is available free to individuals addressing requests on their company letterheads.

GEARS GOOD GEARS ONLY

All Kinds—Any Quantity
AT THE RIGHT PRICE
THE CINCINNATI GEAR CO.

MUMMERT-DIXON SWING FRAME GRINDERS



Sizes 12", 14", 16", 18", 20" and 24" wheels.

Ask for Descriptive Circular

M U M M E R T - D I X O N C O .

120 Philadelphia 5t. • Hanover, Pa.



Woester Pike

POBCO NON-METALLIC BEARINGS



Cincinnati, Ohio

SELF-LUBRICATING

Will outwear babbitt or bronze by margins greater than 3 to 1.

No oil drip, no hardening or glazing, variable speeds, silent operation, micrometer tolerances.

Specializing in odd-shaped bearings for intricate and precision applications.

Long life-low cost.

Prompt deliveries, quality and accuracy guaranteed.

For all machinery — for most conditions
Write for descriptive circular.

SAMPLES ON REQUEST

PARAMOUNT OILLESS BEARING CO., INC.

, 1946

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SERVICES DIRECTORY

GRINDING • STAMPINGS • TOOL and DIE WORK MACHINE WORK • CASTINGS • HEAT-TREATING FORGINGS • EMPLOYMENT • BUSINESS • ETC.

PRECISION GROUND GEARS CAMS THREADS SPLINES

Excellent facilities for grinding gears, cams, threads and splines on a contract basis.

SEND BLUEPRINTS FOR ESTIMATE

HARTFORD SPECIAL MACHINERY COMPANY

300 HOMESTEAD AVE. Hartford, Conn.

CENTERLESS GRINDING

Straight, Cylindrical, Shoulder, Profile, and Multiple Diameters . . . Ground Taper Pins Screw Machine Products. Heat treated and ground if necessary. Improved and expanded facilities insure prompt and accurate service. Send blueprints or samples for estimates.

PORTER MACHINE CO. 3139 Enyart Ave., Oakley, Cincinnati, Ohio

PATTERNS

Wood and Metal — also Match Plates. For all kinds of castings—large or small. Estimates on Request.

GENERAL PATTERN WOKKS
2231 Buck St., North of Harrison Ave.
Phone MAin 4751
Cincinnati, Ohio

AUTOMATIC AND HAND SCREW MACHINE PRODUCTS

... up to 2" diameter — any material — small or large quantities. Prompt service.

IMSANDE SCREW PRODUCTS CO. 3517 Cardiff Ave., Oakley, Cincinnati, Ohio

CENTERLESS GRINDING

SINCE 1925

CINCINNATI
ICE PICK & TONG MFG. CO.

118 BURROWS ST.

CINCINNATI, O.

CENTERLESS GRINDING





EXTERNAL

Send blueprint or sketch for quotations

FOULK MANUFACTURING CO.

4208 AIRPORT RD. . CINCINNATI 26, OHIO

GRIND THE

Eastern Centerless Vi'ay

Our new plant with increased facilities assures

PROMPT SERVICE

Eastern Centerless Grinding Co. 470 Tolland Street East Hartford B. Conn.

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BAKELITE SILENT GEAR SERVICE

ALL SIZE BLANKS IN STOCK.

Teeth Cut To Your Specifications.
Prompt Delivery. Write for quotation.

GREAVES MACHINE TOOL COMPANY

2009 Eastern Avenue

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Co.

, 1946

Cincinnati, Ohio

"Broach and Tool Sharpening" is the litie of a 16-page booklet prepared by The Lapointe Machine Tool Co., Hudson, Mass., which provides complete illustrated and descriptive information regarding the sharpening of all types of broaches, and featuring the Lapointe Universal Broach Sharpener. Copy free.

Hobart Are Welding Accessories. A complete line of accessories for arc welding is illustrated and described in a folder published by the Hobart Bros., Co., Box DM-709, Troy, Ohio. All items are properly identified with catalog numbers for simplification in ordering. Copy of Folder DM-709 free upon request.

"Production Broaching on Zagar Broaching Machines" is the title of a four-page bulletin issued by Zagar Tool, Inc., 23880 Lakeland Blvd., Cleveland, Ohio. The bulletin illustrates and describes the Zagar 10-Inch Vertical and 20-Inch Horizontal Broaching Machine and their use in the production of various parts. Copy free upon request.

Manhattan Engineered Finishing Wheels, available in several resiliencies with a synthetic rubber bond, are described in a bulletin issued by the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J. In addition to discussing the various features of these polishing wheels, the bulletin contains a table giving maximum safe operating speeds for each type of polishing wheel bond. Also included is a list showing the range of application of other Manhattan rubber and resinoid bonded abrasive wheels.

Copy of the bulletin can be obtained free of charge by writing to the Abrasive Wheel Department of the above firm, requesting Bulletin No. 6881-A. Metal Forming Dies and Special Machinery. The Cyril Bath Co., 6983-90 Machinery Ave., Cleveland 8, Ohio, has issued a 36-page catalog featuring dies for press brake use as manufactured by the company. The catalog illustrates virtually all types of dies used in press brake work, including forming dies of various types, multiple punching equipment, blanking dies, straightening dies, louvering dies, and so on, and provides suggestions regarding the care and use of dies, as well as tables of pressures helpful in press brake work. Copy of Catalog D-22 free upon request.

"Handbook on Stainless Steel." A 100-page pocket-size (5 x 7½ x ½-inch), handbook presenting practical information on 26 types of stainless steels has been published by the Allegheny Ludlum Steel Corp., Brackenridge, Pa. This handbook brings up to date, supersedes, and amplifies the stainless steel chapters of the earlier "Handbook of Special Steels" and includes most of the data and information that are available on file-size "Blue Sheets" for the various types of stainless steel.

The handbook contains a 44-column finder chart providing analyses, properties, hot working temperatures, and heat treatment information concerning the different types of stainless steel and a general discussion of the types and properties of stainless. This is followed by a table of corrosion resistance of four leading types of stainless to 230 chemicals and common materials.

Fabrication methods and procedures described include welding methods; press forming, drawing and blanking; machining techniques; spinning qualities; tools and methods; upsetting and forging; riveting, shearing, soft soldering, silver soldering, annealing and heat treating, grinding, polishing and buffing, and surface treatments, including the removal of welding flux, degreasing, sandblasting, pickling, and passivating, steel products, including plates, sheet, strip, bars, forging billets, tube stock and tubes, angles, wire, castings, forgings, and clad steel (Pluramelt), are described in a 20-page section. Final pages contain general tables of bar weights, weights of sheet, weights of tubes, feet per pound of wire, decimal equivalents of fractions of an inch, and temperature conversion.

Copy of "Handbook on Stainless Steel" is available free to mechanical executives upon request.

"The Trend Is to Trent" is the title of a four-page bulletin published by the Harold E. Trent Co., Leverington Ave. and Wilde St., Philadelphia 27, Pa., providing illustrative information regarding electrically heated ovens, furnaces, kettles, jackets, laboratory equipment, strip, cartridge and immersion heaters, and so on. Copy of Bulletin MC-46 free.

Whitney-Jensen Metal Working Tools and Machinery. The Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill., has prepared a 42-page plastic-bound catalog which provides illustrations, descriptions, specification and other tables concerning punches, shears, foot presses, bending brakes, power presses, power shears, dies, and small tools. Copy of Catalog No. 16-45 free to mechanical executives upon request.

Lectroetch, Electrolytic Stencil Etching Process for the inspection, tolerance identification, and other marking of metal parts and tools is fully discussed in a six-page illustrated folder now available free from The Lectroeth Co., 1727 Doan Ave., Cleveland 12, Ohio.

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Barnesdril Magnetic-Automatic Coolant Separators for vertical and horizontal honing machines, internal, centerless. cylindrical, disc, surface, and thread grinders are thoroughly illustrated and described in a 12-page bulletin prepared by the Barnes Drill Co., 814 Chestnut St., Rockford, Ill. Installation views of the various types of coolant separators are included in the bulletin, copy of which is available free. Ask for Bulletin 151-D.

"Steam-Detergent Cleaning with Oakite Solution-Lifting Guns" is the subject of a 28-page booklet published by Oakite Products, Inc., 32F Thames. St., New York 6, N. Y. Described are many applications of steam-detergent cleaning for (1) cleaning machinery and parts for subsequent repair and overhaul, (2) preparing equipment surfaces for repainting or refinishing, (3) cleaning equipment too large for tank immersion or where suitable tanks are not available, and (4) paint stripping. Copy free upon request.

Stainless Data Sheets. Allegheny Ludlum Steel Corp., Brackenridge, Pa., announces the availability of "Blue Sheets" of reference data on Allegheny stainless steel castings (8 pp.), stainless Types 347 and 321 (4 pp.), Type 416 (4 pp.) and Ludlum 609 shock-resisting steel for too's and machine parts (4 pp.). These file-size sheets contain reference data certified by the Allegheny Ludlum technical staff and prepared from carefully checked laboratory and service tests. Physical properties, corrosion and oxidation resistance, effects of elevated temperature. and heat-treating procedures and results are presented in condensed form for quick reference. Copies of data sheets free upon request.

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The manual is of the composite type, divided into sections according to die size and type. Thus, separate instructions are given for finishing dies of 2-inch hole size and over; for finishing both standard and small special shape dies; for finishing extrusion dies; and finishing carbide mandrels. This arrangement facilitates quick reference and avoids possible confusion in finishing instructions.

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ment which should aid materially in following the procedures recommended.

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"Safety" Grinding Wheel Facts and Figures. A handy-pocket-size illustrated reference booklet presenting facts and figures on grinding wheels in a manner appreciated by busy engineers is announced by The Safety Grinding Wheel and Machine Co., Springfield, Ohio. The booklet tells how to select the proper grades and types of wheels for hundreds of grinding jobs, how to correct faults, causes of unsatisfactory finishes, and so on. Copy free upon request.

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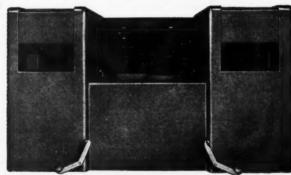


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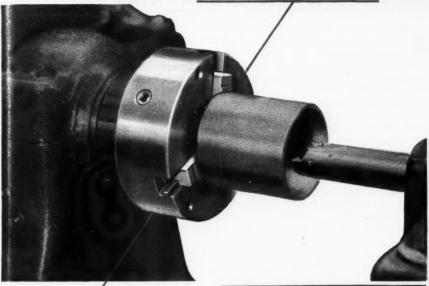
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Over the Editor's Desk

A S we go to press the President of the United States has ordered the striking locomotive engineers and trainmen and the coal miners to go back to their jobs, under penalty of prison for the labor leaders and induction in the army for the union members. Thus another and highly important step is taken in the matter of management-labor relations.

There was a time—and not so long ago—when pretty nearly all labor was hand labor, and no great amount of capital was required to engage in manufacturing. Little mechanical equipment was available; each workman brought his tools with him. The employer was usually a tradesman himself, but with the extra business sense to find markets for more than he could produce alone, and then hire expert workmen to produce as much as he could sell. If one mechanic didn't want to work for him, another one would, and he was free to hire whom he wished.

With five farm families to each city family there was plenty of food. With vast forests surrounding the cities, one would either cut his own fuel or hire someone to cut it for him. Only those who owned property were required to pay taxes. Life was comparatively free and simple.

With the growth of the nation and the development of industry to meet the nation's needs all this has changed. Today approximately six families in the city are maintained by one family on the farm. The value of wood has increased to such a point that it is no longer available for fuel. Modern industry is based upon the use of highly specialized buildings and facilities and equipment; hand labor has gone with the ox-cart.

Today, for each man who asks for and receives a job in the steel industry, someone who had the money has had to invest \$7,620 in buildings and equipment and tools. For each workman in the Ford Motor Company's plants the Ford Company has invested \$9,000. To create a job in a General Motors plant the company spends over \$6,000, and the average throughout the rest of American industry is \$4,000 per job. This money is invested, not by the workman, but by the employer.

In the days of hand labor the workers labored 60 to 72 hours a week for a wage of 10 to 15 cents an hour. Today 40 hours per week is the rule, with pay averaging, in most industries, better than a dollar an hour. Once an employer could hire anyone who asked for a job, and discharge him again if his work was unsatisfactory. Today he cannot hire a worker who is not a union member, and cannot discharge him without union approval.

Along with the development of our country and the vast increase in population the living standards of the American people have steadily been raised. Today the average American family has living facilities that were undreamed-of 100 years ago—automobiles, radios, telephones, electric sweepers, electric laundering machines, and so on—the larger part of which are produced in modern high production plants.

A workman no longer sets up in business with a few hand tools; he becomes a part of a great industry in which a man can work only if all the others work at the same time. He no longer can step out into an adjacent wood to gather his fuel; he must depend upon the coal industry and its workers to keep him supplied. He no longer buys his food supplies direct from the farmer who has brought them to market; food must be shipped by trainloads into the cities and towns. And the fuel industry

and the food industries and the manufacturing industries and all the rest of the machinery of our present-day civilization is dependent upon the transportation industries. Each section of our national life is dependent upon other sections, and unless all function efficiently the life-blood of the nation ceases to flow, with suffering as an inevitable result.

With all of our increased living standards, we have become so inter-dependent that the nation must function as a unit if it is to continue in a healthy condition. Each section of our industrial life, including both management and labor, has assumed responsibilities which it must now discharge faithfully, regardless of temporary dissatisfaction with the task. Our national management methods are obsolete when one or two men, or groups of men, can paralyze our national life over-night by ordering their industries to suspend operations.

This thing has been forced upon us once; it must not be allowed to happen again. The nation is bigger than any individual, or any group.

Howard Campbee

"Steel in the War." The war role of a basic American industry and its largest producer is fully revealed in a book entitled "Steel in the War," published by the United States Steel Corp., 71 Broadway, New York 6, N. Y. Generously illustrated, the book assembles facts and figures which measure the importance to the national security of steel and has been made available to thousands of libraries where it may be used as an industrial reference volume.

Throughout "Steel in the War" stress is laid on the extreme care taken in the manufacture and testing of steel and steel products to assure top-notch qual-The book traces the development of many new steels and new uses of steel which were invaluable to our armed forces and our Allies and are now available for postwar needs. The story of the steel helmet, the landing mat for planes, the perfection of the high-pressure steam turbine to drive ships faster and farther on less fuel, the free-fall cargo package for supplying front line troops by air, the heatresisting steel tubes for jet propulsion planes, and scores of other production miracles are described. In addition, the development of new production methods is recited in this diary of war production.

Also included are official figures of the Army and Navy, the War Production Board and Lend-Lease Administration which measure the gigantic war task accomplished by the steel indusry and other war suppliers who produced military articles from steel.

"Infra-Red Parade" is the title of a 12page brochure published by The Fostoria Pressed Steel Corp., Fostoria, Ohio, illustrating and describing the application of the infra-red process to reconversion where dehydrating, drying, baking, and preheating operations are involved. In addition, the brochure depicts and describes how infra-red was employed in the production of war materials, including metal life rafts, airplane motor parts, auxiliary aircraft gas tanks, rocket fins, parachute containers, and torpedo net floats. Copy free upon request.

Melin High Speed Cutting Tools. The Melin Tool Co., 1331 Phillips Ave., S. W., Grand Rapids 7, Mich., now has available a 12-page catalog which provides illustrated. descriptive, and complete tabular information, including list prices, on the various end mills, center drills, and special mills offered by this firm. An end mill speed chart and data on the use and care of end mills are also provided in the catalog, copy of which is available free upon request.

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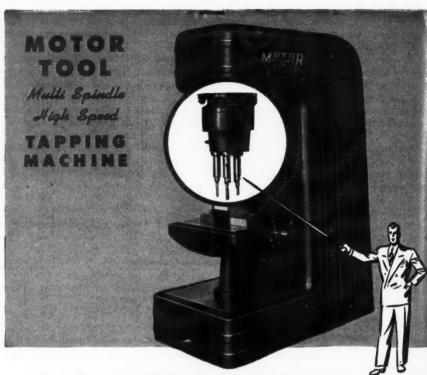
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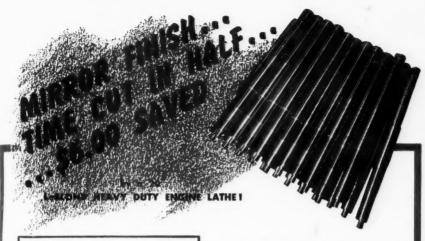
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